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I.—*Notes on the Buddhas from Ceylonese authorities, with an attempt to fix the dates of the appearance of the last four; being those of the Mahá Bhadra Kalpa, (or Present Age.) By Captain* J. Forbes, *H. M. 78th Highlanders.*

1. Of the Buddhas who appeared prior to the *Mahá Bhadra Kalpa,* the names of the earliest Buddhas mentioned in Buddhist writings, are

Brahma Buddha.
Gautama Buddha*.
Tanhankara.
Medhankara.
Saranankara.

The following are the names of twenty-four Buddhas, who successively foretold the advent and exaltation of the present Gautama Buddha.

1 Deepankara,
2 Kondhanyo,
3 Mangalo,
4 Sumano,
5 Reweto,
6 Sobhito,
7 Anomadassi,
8 Padumo,
9 Narado,
10 Padumutto,
11 Sumedo,
12 Sujato,
13 Piadassi,
14 Athadassi-Atthadassi,
15 Dhammadassi,
16 Siddatto,
17 Tisso,
18 Cusso,
19 Wipassi,
20 Sikhi,
21 Wissabhu.

Commencement of the *Mahá Bhadra Kalpa.*

22 Kakusanda,
23 Konagamma,
24 Kásyiapa.

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* Not the Gautama Buddha now worshipped.

Every Buddha, on having attained the object of his ambition, not only appropriated to himself, and received from his followers the innumerable titles of former Buddhas, (many of which were appertaining to the gods,) but by visiting the same places, enjoining the same observances, retaining the same moral laws, and imitating all their actions; he identified himself with the meritorious deeds as well as with the moral doctrines of his predecessors. From these circumstances it is not easy to particularise the acts of any individual Buddha; and the difficulty has been increased by writers on this subject, who in general have preferred aimless dissertations to historical incidents.

Of KAKUSANDA,

The first Buddha in the present dispensation, B. C. 3101*.

At the commencement of this the *(Mahá Bhadra Kalpa)* most auspicious age of the world according to Buddhists, KAKUSANDA BUDDHA appeared in *Magadha*†, when KSHEMA‡ was king, and the name of the capital was Kshemawattinuwara§. He visited Ceylon, which then was known by the name of *Oja Dweepia,* and first manifested himself from Adam's peak, at that time called *Dewiyakuta,* and on the summit of which he found memorials of the religion of former Buddhas were still existing. The Mahamuvuna gardens (comprising the plain on which the most sacred edifices at Anuraadhapura are situated) was called Mahâtirtiwana; and to the eastward of these was the city Abhya, the residence of a king of the same name; here also was situated the Piyal Kula mountain, (afterwards called Mehintallai) and a cave which the Buddha chose for his temporary abode. A pestilence which had swept off multitudes, having ceased at the time of KAKUSANDA's arrival, the people, believing that it was by his miraculous interpositions, eagerly listened to the exhortations, and adopted the religion of their benefactor. The garden Mahâtirtiwana having been offered to the Buddha, he sent to Kshemawatti to procure a branch of the Maharibodi tree; that it might remain as a memorial of himself, and an emblem of his religion. The tree was sent by the king KSHEMA under charge of the priestess RUCHITANANDA and the priest MAHADEWA, and accompanied by numerous priests, priestesses, and attendants; they arrived safely, and the tree was planted by the king ABHYA according to the privilege; and with the ceremonies which had been usual on such fortunate occasions by former monarchs of the island. The place selected for the tree was near the plain Sirisamála, where the Buddha had once rested himself, and which in after times became the site of the Lowa Maha Páyá*. Having preached from where the Thupa Rama† afterwards stood, and made innumerable converts; KAKUSANDA bestowed his drinking cup as a memorial to his followers; appointed RUCHITANANDA chief over 500 priestesses, and MAHADEWA over 1000 priests, to maintain religion; then having seen the consecrated places of Ceylon, and revisited Deviya Kuta, he departed to the continent of India.

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* The period not of his birth or death, but of his becoming a Buddha.

† Magadha, Bahar.

‡ Kshema.

§ Kshemawatimuwara or Khemawatinuwara, probably Saewatnuwara, or Gaya; the great antiquity of which city may be inferred from the manner in which it is mentioned in the Rámáyana. In the transmigrations of Gautama Buddha, before he attained the perfection necessary for a Buddha, he is said to have been incarnate at this time as this very king KSHEMA, vide Siddhamasuma, Thupa Wansae, &c.

From these particulars it would not appear that the commencement of the *Mahá Bhadra Kalpa* was marked by any general revolution in the face of nature; but the commencement of an era at that time may be rationally accounted for, by the successful ministry of KAKUSANDA BUDDHA; this would also account for the same era being styled *Kali yuga* (age of vice) by the bráhmans; and *Mahá Bhadra Kalpa* (the most auspicious age) by the Buddhists.

In support of my opinion for fixing so remote a period as the commencement of the *Kali yuga* B. C. 3101, as the era of this Buddha; I have the unanimous assertion of Buddhist writers, that he appeared at the commencement of the present age, or *Mahá Bhadra Kalpa*. Sir WILLIAM JONES‡ writing on this subject says, "The best authority after all is the *Bhágawat* itself, in the first chapter of which it is expressly declared, that BUDDHA the son of JINA would appear at *Cicata*§ for the purpose of confounding the demons, just at the beginning of the *Kali yuga*." Again I quote from the same authority‖: "Bhrigu says, From this MENU named SWÁ YAMBHUVA, 'or sprung from the self-existing,' came six descendants, other MENUS, or perfectly understanding the scriptures, each giving birth to a race of his own all exalted in dignity, eminent in power—

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* At Anuraadhapura. In the remains of this building are still to be seen (1600) rough stone pillars.

† At Anuraadhapura. A Dagobah and Wiharé, now in ruins; the slender, but elegant columns of which, have not inaptly been compared to the Areka tree.

‡ Sir WILLIAM JONES, Asiatic Researches, VII. 122.

§ Bahar.

‖ Sir WILLIAM JONES, Laws of Menu, Article on the Creation, Section 61.

"Swárochisha,—Auttami,—Tamasa,—Raiwata likewise, and Chácshusha beaming with glory, and Vaivaswata child of the Sun."

Chácshusha is evidently the same name as Kakusanda, the final letters being a usual honorary affix in Cingalese. He is called by BENTLEY, Chåksooso[*], by WILFORD Cháshusha[†], by WILSON Chákshusa[‡], by COLEBROOKE Cucuch'handa[§]; he is also called Karkutchand[||], Prachanda Dewá[¶], and Krakuchanda[**]; and appeared as a Menu or Muní, (which in Cingalese is a term applied to a Saint or a Buddha,) *previous* to Vaivaswata, who by many of the most eminent chronologers has been considered identical with Noah, B. C. 2984.[††]

The Cingalese works state that KAKUSANDA was of the race of SAMATA Rája. The first Menu, also the first king, and elected by the people, after they had lost immortality and become subject to earthly passions[‡‡].

At the time of KAKUSANDA BUDDHA, Adam's peak was called Dewiyakuta, (peak of God;) when KONAGAMMA BUDDHA visited it B. C. 2100, the name was Samantkuta, (peak of Saman.) This appellation I should infer from Cingalese history it obtained from SAMAN[§§], brother of RA'MA; whose era is fixed by the date of the partial submerging of Ceylon, B. C. 2387, which is three years previous to the date of the flood[||||], and thus refers KAKUSANDA BUDDHA to a period preceding that event.

The following quotation is from TOD's Annals of Rájasthán; "Though a passage in the Agni Purán indicates that the line of Súrya, of which ICSHWACA was the head, was the first colony which entered India from Central Asia, yet we are compelled to place the Patriarch BUDDHA as his cotemporary, he being stated to have come from a distant region, and married to ELLA the sister of ICSHWACA." Referring to the era of RÁMA as already given, viz. B. C. 2387, and allowing 20 years as the length of each reign of the thirty-six sovereigns from RA'MA up to ICSHWACA, would give the date B. C. 3107 as the time of ICSHWACA, and confirm the above passage regarding BUDDHA being contemporaneous with this monarch; and a similarity of sound, as well as coincidence of date, tempts me to suggest the possible identity of ICSHWACA with KSHEMA or KSHEMAKA, who is described as being the royal patron of KAKUSANDA BUDDHA*.

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[*] Remarks on the eras and dates of the ancient Hindus, Asiatic Res. V.

[†] WILFORD's Chronology of the Hindus, Asiatic Res. V.

[‡] Sanscrit Dictionary.

[§] COLEBROOKE's observations on the Jains, Asiatic Res. IX.

[||] Asiatic Journal, 1832, p. 380.

[¶] Asiatic Journal, 1834, p. 220.

[**] Asiatic Journal, No. 48, p. 87.

[††] Dr. LLOYD's Bible chronology.

[‡‡] Jananda Pota, (Cingalese work.)

[§§] SAMAN, LACKSHMANA, brother of RAMA.

[||||] According to Dr. LLOYD's Bible chronology, Noah was born B. C. 2984, and the flood commenced when Noah had lived six hundred years, two months and seventeen days, Gen. vii. 11; or B. C. 2384.

To explain why I have fixed the era of RA'MA, B. C. 2387. The Rájawalia states that from the time of RAWENA until the era of GAUTAMA BUDDHA (at which time a connected Cingalese history commences†) 1844 years had elapsed. In several Cingalese works‡ the partial submerging of Ceylon is mentioned as having occurred immediately after the death of RAWENA; and the consequent decrease in the circumference of the island is stated to have been 133 yoduns or 2128 miles§. It was in this visitation that the splendid capital Srí Lanká-pura (which was situated to the north-west of the present island) is said to have been overwhelmed, and

"Towers and temples through the closing wave
A glimmering ray of ancient splendour gave."

Of KONAGAMMA,

The second Buddha of the present dispensation, B. C. 2099.

At a time when long continued draught had caused scarcity and sickness in Ceylon, KONAGAMMA BUDDHA appeared‖; and seasonable rains having fallen, the consequent prosperity of the country was attributed to his power and presence. At this time the island was called Wara-dwipa, and the peak on which he, according to the custom of his predecessors, commenced his ministry in Ceylon, was called Samanta-kuta or Samanella; from thence he visited the capital Wadhamanika, situated on the south side of the Maha-Mewuna gardens*, which then bore the name of Maha-Antowana, and being acknowledged as a Buddha the king SAMURDHA dedicated to him these gardens by the name of Anopawana. At the request of the prophet, the king SOBHANA sent from the continent of India a branch of the Udambara tree, accompanied by many priests and priestesses; the whole were received with due honor, and the Udambara tree planted by the king SAMURDHA became the emblem of the new Buddha. KONAGAMMA BUDDHA (after having visited the various places consecrated by the presence of former Buddhas in Lanká) gave charge over the priestesses to the chief priestess KANAKADANTA, and over the priests having placed SUDHAMA, he bestowed his girdle as a memorial to his followers, and departed for the city of king SOBHANA.

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* Thupa Wansae, Buddha Wansae, Mahawansae, Saddhama Sumana, Rájawalia, Rájakatnaikara.

† Translated and arranged by Mr. TURNOUR, from B. C. 543 to A. C. 1815.

‡ Rajawalia, Kadaimpota, Lanká Wistrie. The Kadaimpota also records a similar calamity as having reduced Lanká to its present size, B. C. 267.

§ In GUTZLAFF's History of China, the following near coincidence of dates with regard to the deluge occurs. "We are now arrived at a period which CONFUCIUS himself has delineated."

"YAOU began to reign B. C. 2337." "There is an extraordinary catastrophe mentioned in the reign of YAOU, which is one of the greatest events in the history of mankind, the deluge. MANG-TZE (Mencius) in speaking of the same event, remarks, that at the time of YAOU the deluge had not yet entirely subsided. During the reign of YAOU, YU commenced the draining of the waters, and the confining of the rivers to their beds."

‖ KANAKA-MUNI, Asiatic Journal, 1834, p. 220.

Regarding the date which I have assigned to this Buddha, viz. B. C. 2099.

I have connected the reign of PRADYOTA king of Magadha, with the time of KONAGAMMA BUDDHA, by the various accounts of the incarnations and transmigrations of GAUTAMA BUDDHA; these all state that at the time of KONAGAMMA, GAUTAMA was incarnate as that fortunate king of Magadha, PARWATIA or PARGUYATA†; whom I consider the same as PRADYOTA of JONES and BENTLEY, PRADHYOTA of WILFORD, and PRIDOT'HANA of TOD. These authorities all agree that in the reign of that king a Buddha appeared, although they have all assigned different dates to the event. I follow that of Sir WM. JONES, who gives his authority; a quotation from the Bhagawatamrita. "He (Buddha) became visible the thousand and second year of the Kali yuga being past."

"PURANJAYA son of the twentieth king (of Magadha) was put to death by his minister, SUMACA, who placed his own son PRADYOTA, on the throne of his master; and this revolution constitutes an epoch of the highest importance; first, because it happened, according to the Bhagawatamrita, two years exactly before BUDDHA's appearance in the same kingdom; next, because it is believed by the Hindus to have taken place 2100 B. C.; and lastly, because a regular chronology, according to the number of years in each dynasty, has been established from the accession of PRADYOTA to the subversion of the genuine Hindu government." In the Cingalese accounts we find KONAGAMMA received that protection and assistance from the king SOBHANA*, which his predecessor had received from the king KSHEMA. In the list of kings of the line of Buddha, of the Ooru or Oorvasu branch, in Colonel TOD's tables, and about the year B. C. 2050, we find the name of the king SOVAHANA; and in supposing SOBHANA and SOVAHANA identical, there is neither discrepancy of dates nor designation, for KONAGAMMA BUDDHA only *appeared* B. C. 2099, and as there is no letter *v* in Cingalese, SOVAHANA would be written SOBHANA, that being the nearest transmutation.

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* At Anuraadhapura.

† Lest the father of PRADYOTA being a murderer, and himself an usurper, should be made objections against this being the king PARWATIA, in which Buddhist writers have declared that GAUTAMA BUDDHA was incarnate, I quote the life of the most revered of Buddhist sovereigns, DHARMASOKA, as it is written by Buddhist priests, and which may be thus abridged:

He commenced his career as ASOKA, a prince and a bráhman; attained power by becoming a fratricide and usurper; B. C. 323, retained it as a zealous Buddhist, and died king of India, at Patalipura, (Patna.) His memory has been extolled by all Buddhist writers, and his name and deeds are sanctified by the appellation DHARMA (the righteous) prefixed to ASOKA.

We also find, that GAUTAMA was believed to have been incarnate as SAKYA, a chief of the YAKSHAS, and as ATULA a king of the Nagas.

Of KÁSYAPA,

The third Buddha in the present dispensation, B. C. 1014.

On KASYAPA visiting Ceylon, he found it called Madá-dwipa; and the capital Wisala, situated on the west of the Mahá-Mewuna gardens, was the residence of the king JAYANTA. The people were divided into two hostile parties, the one, headed by the next heir to the throne, SAMIDDHO; the other by the king's ministers: the armies had approached each other, and were only prevented from engaging by a dreadful conflict of the elements, accompanied by darkness, and succeeded by showers of fiery sparks. KASYAPA at this time descended from the peak, which was then called Subhakuta, and having succeeded in reconciling the contending parties, was acknowledged as a Buddha, and the Mah-Mewuna gardens were offered to him by the name of Sagara gardens. From Brahmadatta of the Okaká† race, king of Baranas‡, he procured a branch of the Nigródha tree, which was accompanied by numerous priests and priestesses; and was planted in the consecrated ground of Sagara, by the king JAYANTA, with the ceremonies which had been performed on such occasions by former kings. KASYAPA after converting the people, and visiting the places hallowed by the presence of former Buddhas, bestowed as a relic to his followers, the bathing cloth which he had used; then giving charge over the 500 principal priestesses to the chief of them SUDHAMMA; and over 1000 priests placing SARWAMANDA to maintain religion, he departed from the island to return to Baranas. Regarding the date which I have assigned to the commencement of Kasyapa's ministry :—

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* SOBHANA. † Okaka, same as Ikshwaka. ‡ Benares.

In a fragment of a poem which has the appearance of having been rendered into Cingalese from Sanscrit, called the Leechawee history, Brahmadatta, king of Baranas, is mentioned, and that Buddha was then residing in that city. The date is given in round numbers 2000 years after the commencement of the Kali yuga, which corresponds with .... B. C. 1101

Padmakarpa, a Lama of Bhotan, fixes the date,	1058
The Chinese place the birth of Buddha[*],	1036
M. Bailly[*],	1031
Matonan Sin, a Chinese Historian[†],	1027
De Guignes, from Mongolian records[*],	1027
Japanese Encyclopedia fixes his birth,	1027
Ditto ditto his death,	960
Inscription at Buddha Gya[*],	1014
Mongol Chronology of Pallas,	991
Cassiano by the calculations of the Tibetians appeared[‡],	959
Ditto ditto died,	950
Giorgi, death of Buddha,	959
La mort de Bouddha, on plutot de Shakyamuni le premier de Bouddhas, est placée par un monument d'une authenticité incontestable, L'Encyclopedie Japonaise, en 950 avant notri ére[§],	950

From these concurring dates, I am inclined to believe, that the death of Kasyapa Buddha occurred about B. C. 950, and the earlier dates given above, are either that of his birth or of his having become a Buddha.

Of Gautama,

The fourth Buddha in the present dispensation—Became Buddha, B. C. 588; *died,* B. C. 543.

B. C. 543 is the era of Gautama Buddha, and generally used in the religious and historical works of Ceylon.

It is this Gautama whose moral doctrines are recognised as the rule of conduct; whose name is still invoked as the present Buddha by the Cingalese; and the existing records of whose life and ministry are so minute and credible, that they may fairly claim to be admitted into genuine history. The following are a few of the most remarkable events of his life, particularly as connected with Ceylon.

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[*] From Sir William Jones's Chronology of the Hindus.

[†] Prinsep's Chronological Tables.

[‡] Wilford's Chronological list of the kings of Maghada.

[§] Messrs. Bournouf et Lassen.

Prince SIDDHARTA, the son of king SUDDHODANA, by one of his queens MÁYÁ, was born at Kapilawasta or Kumbúlwatpura, a town of Central India*; at 16 years of age he was married to the princess YASODARÁ (called also SUBHADDAKACHCHÁNA), and when 29 years of age his wife brought him a son (who was called RAHULA, and afterwards became a priest). On the same day that his son was born, SIDDHARTA forsook his family and country, and commenced a life of penance and meditation, which he continued for six years in the forest of Oorawelle; during this period existing solely by charity, and feeding on wild fruits. He fasted for 49 days, and after a severe struggle having finally overcome MARYA and his attendant host of demons†, became a Buddha by the name of GAUTAMA.

GAUTAMA BUDDHA proceeded to commence his ministry, and first expounded his doctrines at the grove called Isipataná in the neighbourhood of the city of Baranas. In the ninth month after he became Buddha, GAUTAMA arrived at the town of Maháwelligam‡ the capital of the Yakshas in Ceylon, and which then covered a space twelve miles in length and eight in breadth on the banks of the Mahawelliganga. The majority of the Yakshas appear to have been converted, and to have driven those who adhered to their ancient superstitions into an island called Yakgiri. Tradition places this island to the south-east of Ceylon, and the legends which are preserved (on that coast) of sunken cities, may refer to some territory, of which the Bass rocks are all that now remain.

A portion of the hair of the Buddha was enclosed in a golden casket, over which a Dágoba was built at Myungana§ in Mahawelligam, and this relic is said to have prevented the return of the Yakshas‖ (devils) whom Buddha had expelled: i. e. the worship he had superceded.

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* Madhya-désia.

† It might be translated overcame death and deadly sin; for (mára) and (mara) signifies death, destroying, lust; also a name of KAMA, god of love. CLOUGH's Cingalese Dictionary.

‡ Where Myungana now stands in Beentinne.

§ Myungana is still a sacred place of pilgrimage near the village of Beentinne; the Dágoba originally built by the chief of the converted Yakshas, was afterwards enriched by the addition of the Griwa (neck bone) relic, and enlarged to the height of twelve cubits; it was increased by the king CHULA BHYA to thirty cubits, and Dútúgaimúnú, between 164 B. C. and 140, raised it to the height of ninety cubits.

‖ The superstitions of the Yakshas had again become general in the time of PANDUKABHYA (100 years after Buddha), and continued to prevail until B. C. 307.

The second visit of GAUTAMA BUDDHA to Ceylon was B. C. 581; on which occasion he reconciled two rival princes of the Nágás, CHULODRA and MAHODRA, who had been carrying on a destructive war. These princes were near relations, and their capitals of Kellania* and Wadenawágalla† were situated in that part of the western coast of Ceylon which was then called Nágá-diwinia. On the termination of their feud, the throne for which they had contended, was made an offering to the Buddha, and enshrined by the Nágás in the Dágobah of Kellania‡ to be worshipped as a memorial of their teacher.

GAUTAMA BUDDHA a third time came to Ceylon B. C. 577, and having revisited Kellania, from thence proceeded to Samanella (Adam's peak), Diganakhya in Ruhunu, the eight places at Anuraadhapura, and all others which had been sanctified by former Buddhas; then took his final departure from the island, and proceeded to his principal residence in the temple of Jaitawanarama in Saewatnuwara§ of Magadha. GAUTAMA BUDDHA continued to be indefatigable in publishing his doctrines, and to be eminently successful in increasing his followers, and at last died placidly at a short distance from the town of Kusinaránuwara in Malwa, in the 81st year of his age, and B. C. 543.

Of Maitrí,

THE EXPECTED BUDDHA, WHOSE ADVENT IS FORETOLD BY BUDDHISTS.

Buddhists believe that to complete the predestined number of the Buddhas, allotted for the *Mahá Bhadra Kalpa,* and to renovate the faith of a degenerating race, MAITRI BUDDHA will be born of WIHARE DEWI, who in her last transmigration was the daughter of KELLANIA TISSA RA'JA, and who about B. C. 220 became queen of Mágam‖, and wife of KAWANTISSA RÁJA.

The emblematic tree which will be selected by MAITRI' BUDDHA, and become sacred from the time of his appearance until the end of this Kalpa, it is predicted will be the Nágaha or iron-wood tree.

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* Kellania, four miles from Colombo.

† Wadenawágalla in the Swinkorles.

‡ This Dágoba still exists.

§ Buddha Gya is probably Saewatnuwara, and contains amidst its shapeless ruins the remains of GAUTAMA's residence; as well as the wreck of those splendid temples which were built to commemorate his worth, or cover his relics.

‖ The ruins of the city of Mágam, extend over a considerable space, and include several large Dágobas ruined and overgrown with jungle; they lie on the left bank of the Menick Ganga, and between Katragama and Hambantotti; from the latter place to Mágam is fourteen miles.

II.—*Memoir of a Hindu Colony in Ancient Armenia.* *By* JOHANNES AVDALL, *Esq.*, *M. A. S.*

A singular account of a certain colony of Hindus, that emigrated from India into Armenia, is recorded in the historical work of ZENOBIUS, a Syrian Bishop and primate of the convent called Innaknian*, who flourished in Armenia in the beginning of the third century. The narrative was evidently written in Syriac, and intended for the Syrian nation, though the writer seems to have subsequently re-written the same in the Armenian language, but with Syrian characters; the letters of our alphabet having been invented a century posterior to that period. By a very long residence in Armenia, ZENOBIUS was successfully enabled to acquire a perfect knowledge of the Armenian language, in which his history has been handed down to us. This interesting work was published in Venice, in the year 1832, being carefully collated with five manuscript copies, written in different periods.

I shall, in the present memoir, first give a description of this Hindu colony from the narrative of ZENOBIUS, and then an account of the religious wars waged between them and the first propagators of Christianity in Armenia.

" This people had a most extraordinary appearance. They were black, long-haired, ugly and unpleasant to the sight. They claimed their origin from the Hindus. The story of the idols, worshipped by them in this place, is simply this: DEMETR† and KEISANEY‡ were brothers, and both Indian princes. They were found guilty of a plot formed against their king, DINASKEY§, who sent troops after them, with instructions either to put them to death or to banish them from the country. The felons, having narrowly escaped the pursuit, took a shelter in the dominions of the king VALARSACES, who bestowed on them the principality of the country of Taron. Here a city was founded by the emigrants, who called it Vishap or Dragon. Having come to Ashtishat*, they raised idols there in the name of those they worshipped in India. Fifteen years after their settlement in the country, both of the brothers were put to death by the king, for what fault I do not know. He conferred the principality on their three sons, named KUAR, MEGHTI and HORAIN. The first built a village, and called it after his own name *Kuars*. The second founded a village on the plain, and called it after his own name *Meghti*. The third also built a village in the province of Palunies, and gave it the appellation of *Horains*.

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* ԻՆՆԱԿՆԵԱՆ *Innaknian*, literally meaning, nine springs or fountains, which existed in the place.

† ԴԵՄԵՏՐ DEMETR is a Greek name, probably borrowed by the Hindus from the Bactrians or the descendants of the troops of ALEXANDER the Great.

‡ ԳԻՍԱՆԷ KEISANEY is derived from ԳԷՍ کیس *Keis*, which both, in Armenian and Persian, signifies a ringlet or a curling forelock. Thus we have in RICHARDSON کیسوی عنبرآمیز locks fragrant as amber.

§ ԴԻՆԱՍՔԷ DINESKEY is the name of the Indian king mentioned in the Armenian text, for which I have in vain searched in all old historical records and chronological tables of the dynasties of ancient India.

After a certain space of time, KUAR, MEGHTI and HORAIN, of one accord, resolved on changing their abode. They sojourned on the mountain called Kárkí, which to a delightful temperature added a fine and picturesque appearance. It abounded in game, herbs, wood, and all that is adapted for the comfort and convenience of man. Here they raised edifices, where they set up two idols, respectively dedicated to KEISANEY and DEMETR, in honor of whom attendants were appointed out of their own race. KEISANEY had long flowing hairs, in imitation of which his priests allowed the hairs of their heads to grow, which custom was afterwards prohibited by authority. This class of people, on being converted to Christianity, were not deeply rooted in their faith. They durst not, however, openly profess the religion of their pagan ancestors. They continued, therefore, dissemblingly to allow their children to wear plaited hairs on the crown of their heads, in remembrance of their idolatrous abominations."

The description of this idolatrous colony is entirely accordant with the colour, appearance, manners and religion of the present Hindus. The cause of their emigration from India is distinctly stated by ZENOBIUS, but through what route or in what period they found their way into Armenia, it is very difficult to determine. It is, however, clearly evident that they had formed a permanent settlement in our country prior to the commencement of the Christian era. VALARSACES, under whose government they found protection, was grandson of ARSACES, the Parthian, and brother of ARSACES the Great, by whom he was appointed king over Armenia, *Anno Mundi* 3852, or a century and a half before Christ. I shall now proceed to give a translation of ZENOBIUS's narrative of the religious wars of this Hindu people with the first Christian converts of Armenia.

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* ԱՇՏԻՇԱՏ *Ashtishat* was a city in Armenia Major. It was so called from ԱՇՏ *sacrifice*, and ՇԱՏ *many*; for innumerable sacrifices were offered there to the gods and goddesses of Armenia. It might, perhaps, be well compared to Jagannáth or Káli Ghát of this country.

"Having taken our departure from Thordan, we intended to proceed to Carin and Harc. St. Gregory was informed by some of the princes of the existence of two idolatrous temples in the province of Taron, the inhabitants of which offered sacrifices to the devil. Hereupon, our course was changed to the place where these temples stood, with a view to effect their demolition. Having arrived in the country of Palunies, in the extensive village called Keisaney, near the town of Kuars, we met there some of the heathen priests. Having ascertained from the prince of Hashtens that on the following day the great images of Keisaney and Demetr were to be levelled to the ground, they repaired to the temples in the dead of the night, and removed from thence all the treasure into subterraneous places. Intimation of the impending danger was forthwith sent to the heathen priests in Ashtishat, who were earnestly urged to collect warriors, and quietly join them on the morrow in order to take an active part in the battle, which was to be fought by the great Keisaney with the apostate princes. In like manner the inhabitants of Kuars were also instigated to lie in ambush in the hedges of gardens, and ruffians were sent to waylay the Christians in the forests. The head priest, called Arzan[*], and his son Demetr, took the command of the troops stationed at Kuarstan, and halted there, awaiting the arrival of reinforcements from other quarters. On the following day they made a descent to the skirts of the mountain, in order to indulge in marauding and pillage.

"St. Gregory, accompanied by the prince of Arzrunies[†], the prince of Anzevazies, and the prince of the house of Angl[‡], and followed by a small number of troops amounting to about three hundred, ascended the mountain in the third[§] hour of the day, where Arzan lay in ambush. They had not the least knowledge of the position of the enemy, and never expected to meet him there. On a near approach to the acclivity of the mountain, ARZAN and DEMETR rushed out from the ambuscade, and on a signal being given, the trumpets of war were sounded, and a furious attack was instantly commenced. This was enough to alarm the Christian princes, whose horses took fright from the sound of the trumpets, and began to neigh and plunge, and create the greatest confusion. Hereupon, the prince of the house of Angl raised his voice and cried, 'Prince of the Seunies, step forward and see whether these are the troops of the prince of the north.' The necessary inquiries were made, but no satisfactory information was obtained. The prince of the Seunies returned and insisted on the removal of St. GREGORY and his companions to a secure place, lest, he feared, they might be made prisoners by the enemy, which event would surely excite the anger of the king, and bring the Christian princes into disgrace. 'Send then,' added he, 'a trusty person to recall our troops, for the number of the enemy is alarmingly great, and innumerable flags are seen waving in the air.'

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[*] ԱՐՁԱՆ *Arzan,* literally means in Armenian, statue, image or idol.

[†] ԱՐԾՐՈՒՆԻՔ *Arzrunies* was the title of a satrapy in Armenia, and signifies *eagle-bearers.* The Satraps known by this appellation, used to carry eagles before the Arsacian king Valarsaces and his successors.

[‡] ԱՆԳԵՂՏՈՒՆ *Angltún,* the genitive of which is ԱՆԳԵՂՏԱՆ *Angltan,* means the house of *Angl* ԱՆԳՂ or vulture. This was a title of distinction, conferred on a noble family in Armenia, compared to that bird of prey, on account of the ugliness and deformity of their features.

[§] This is to be understood according to the mode of the computation of time, obtaining in eastern countries. The hour mentioned here, corresponds with nine o'clock in the morning. Thus we have in the Acts: "For these are not drunken, as ye suppose, seeing it is *but* the third hour of the day."

"No sooner was the warning given, than the prince of the house of Angl, gave charge of St. GREGORY to the prince of the Mocks, with instructions to convey him to the castle of Olkan, and there to await the issue of the battle. Information of this was immediately sent to the troops. The prince of the Mocks, accompanied by St. GREGORY, descended the declivity of the mountain, wishing to repair to Kuars. They met with great resistance on the way from a party of the enemy, but by the help of Providence, at last succeeded in effecting their escape. We were, however, pursued by a number of villagers, but being mounted on swift horses, took refuge in the castle of Olkan, where we met with a timely assistance and protection. The villagers having proceeded to the town of Kuars, informed its people of the place of our retreat. The castle of Olkan was, therefore, instantly besieged. We were thus seized with apprehensions for our safety, and forthwith dispatched a messenger with letters to the prince of the house of Angl, conveying him information of the perilous situation in which we were then placed. He immediately sent us four thousand troops, all selected from the army, and furnished with swords, who crossed the river and reached their destination on the following day. After a siege of three days, they took possession of the town of Kuars, and reduced its walls to ruins, and razed all its houses to the ground. The people of the place, that had escaped the stroke of the sword, were conducted to Meghti.

"The Christian princes being apprised of this, ascended the mountain, and descried ARZAN in ambuscade with four hundred men, more or less. They immediately made a sortie on the enemy, and put

ARZAN to flight. The Armenian troops having heard the din of battle, immediately crowded to the mountain. Upon this, ARZAN began to rally, and heap on the Armenian princes torrents of abuse. 'Step forward, said he, 'ye base apostates, who disbelieve the gods of your ancestors, and are opposed to the glorious KEISANEY. Do you not know that it is KEISANEY that wages war with you this day, and will subdue you under our hands, and inflict you with blindness and death?' The prince of Arzrunies, having rushed forward, said, 'Thou worthless bully, if you fight on behalf of your gods, you deceive yourselves; if you fight on behalf of your country, you only display your own folly. Behold the prince of the house of Angl, and the prince of the house of Seunies, and the other nobles, whom you know too well.' To which DEMETR, the son of ARZAN, thus replied: 'Listen unto us, ye Armenian princes! it is now nearly forty years since we are engaged in the service of the mighty gods. We have an experience of their powers, and are assured that they fight with the enemies of their servants. We are not, however, able to cope with you in battle. This is the habitation of the king of Armenia, and ye are his nobles. But, be it known to you all, that though it is out of our power to conquer you, yet we prefer to die a glorious death to-day in upholding the honor of our gods, than to live and see their temples polluted by you. Death is, therefore, more welcome to us than life.' Having spoken this, DEMETR challenged the prince of the house of Angl to a single battle.

"The prince of the house of Angl having accepted the challenge, made an instantaneous attack on ARZAN, who inflicted a wound with his spear on one of the thighs of his antagonist, and was on the point of levelling him to the ground. The prince of the house of Angl having, by an adroit movement, regained his position, thus addressed the enemy: 'Know thou this, ARZAN! that this spot must receive the appellation, by which you are called; for here thou art destined to fall, and be fixed like a statue!' No sooner was this spoken, than he lifted up his arm, and aimed a stroke of his sword on his right shoulder, by which his head, together with his left shoulder and leg, was instantly severed from the body. Thus fell ARZAN, and was fixed like a statue on the ground. He was buried on the very spot, which to this day is called, after his name, *Arzan*.

"Hereupon the heathen army was immediately swelled by re-inforcements sent by the priests from the city of Vishap. The people of Partukh, and Meghti and Astaghon, also crowded to the spot of battle, and the number of the army was thus increased to five thousand four hundred and fifty.

" Their arrival in the summit of the mountain, created great noise and confusion in the ranks of the two armies. The heathen priests made a simultaneous attack on the Armenian troops, and by a vigorous pursuit after them made them descend the declivity of the mountain and fly towards the village. The villagers, who lay in ambush, having encountered our troops, stopped their progress, and these being thus hemmed in on both sides, were put to the sword. But the prince of the house of Angl having passed through the ranks of the heathen priests, directed his course towards the mountain, where several men were kept in reserve, and caused great mischief by flinging stones at our horses. Demetr having observed the prince of the house of Angl ascend the mountain, left the rest below and pursued his steps. He was immediately followed by his troops, all mounted on horses.

" The battle was resumed on the top of the mountain. Our army waited in expectation of further re-inforcements. The whole of our troops had not yet assembled on the spot, of whom four thousand remained in charge of the prisoners in Meghti, and three thousand proceeded to Basain and Harc. The rest were given to pillage and marauding in the field. Ere decisive blows were exchanged, the approach of night put a stop to further operations. Both armies were, therefore, obliged to encamp on the spot and wait the dawn of the morn. On the following day the expected Armenian troops made their appearance; and a re-inforcement of about five hundred men, from the city of Tirakatar, came to the assistance of the heathen priests. The number of both armies were swelled in this manner. The heathens amounted to six thousand nine hundred and forty-six men, while the Armenians were only five thousand and eighty in all. The trumpets were sounded, and the battle commenced on both sides. In the beginning the Armenians proved victorious over the heathens. But the prince of Hashtens, formerly attached to the party of Demetr, but now commanding the Armenian army, deserted his post, and joined the ranks of the heathen priests with seven hundred men. The Armenians met with a formidable antagonist in this deserter. Our troops were seized with fear and dismay at the desertion of this brave warrior, whose superiority in military operations was generally acknowledged, and whose extraordinary prowess had rendered him an object of respect and admiration with all the Armenian princes. The rebel attacked our army with the greatest fury, and was flushed with the success of his arms. Hereupon the prince of the Seunies cried to him in a contemptuous voice, 'Thou whelp of a wolf* ! thou beganst to display the disposition of thy father, and feel a delight in feasting upon carrion.' The rebel replied in a bold and reproachful manner, 'Thou vainglorious eaglet† ! thou only piquest thyself on the power of thy wings; but if thou ever fallest in one of my traps, thou shalt soon feel the weight of my arms.' The prince of the Seunies could not brook this taunt, but furiously rushing on him, directed the axe which he held in his hand to his helmet, and having driven him to some distance from his troops, pursued him to the eastward of the mountain. Here, opposite to the convent of Innaknian, he brought him to the ground by a violent shove from the horse; and having himself alighted, instantly severed his head from the body, which he precipitated headlong from the mountain. 'Now,' said he, 'let vultures behold you, and know that the eagle has killed the hare.' Immediately after this, the prince of the Seunies returned to the army; and the place where the prince of Hashtens fell, is to this day called by the appellation of the *Eagles*.

" The Armenians were emboldened by this success, and the prince of Arzrunies attacked the head priest of Ashtishat, called **Metakes**, whom he dragged to the summit of the mountain, commanding a view of the battle. **Metakes** here made a violent resistance, and inflicted a wound on one of the thighs of his pursuer. The latter, burning with rage and a spirit of revenge, levelled a stroke of his scymetar on his neck, which he cut off from the body. He threw down the headless trunk, and the spot where the deed was committed, received the appellation of *Metsakol*.

" The prince of ‡ Arges seeing this, consulted his safety in flight, and secured himself in a place of concealment. The prince of Arzrunies, seemingly not noticing this, gently approached the fugitive, and made a sudden and unexpected attack on him. The wretch fled into the forest, where the sharp point of one of the branches of a tree, having passed through his breast, hastened his fall and dissolution. The conqueror returned with the horse of the dead, and the spot was called the vale of *Arges*.

" Immediately after his return he found **Demetr** and the prince of the house of Angl wrestling together with the greatest fury. Having made a violent rush, he chopped off the right shoulder of the former, and threw it on the ground. The severed head he carried away in his knapsack. The victorious Armenians put the heathen army to the sword, and the number of the killed amounted to one thousand and thirty-eight. The rest were made prisoners, and stripped of all they were possessed of. The son of the prince of the Mocks fell in the battle by the hand of DEMETR, and this melancholy event spread universal sorrow among the Armenian troops.

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* ԳԱՅԼԱԿՈՐԻՒ՛Ն *Gailakoreún*, literally, means a young wolf, or the cub of a wolf.

† Ա՜Յ ԱՐԾՈՒՈՅ ՁԱԳ is an abusive mode of expression in Armenian, similar to that of Ա՜Յ ՇԱՆ ՁԱԳ *thou son of a dog.*

‡ ԻՇԽԱՆՆ ԱՐՋՈՒՑ *Prince of Arges* was another title of nobility in Armenia, literally signifying the *prince of the bears.*

"The fall of DEMETR was made a signal of cessation from slaughter, and the trumpet of peace was sounded by order of the prince of the Seunies. The two armies immediately desisted from the continuance of carnage. The surviving heathen priests gladly availed themselves of the occasion, by soliciting the Armenian princes to sanction the interment of their dead. Their request was readily granted. The killed on both sides were collected in heaps, and buried in pits dug for the purpose. Monuments were raised on their graves, bearing the following inscription, in Syrian, Hellenic, and Ismaelitish characters.

ԱՌԱՋԻՆ ՊԱՏԵՐԱԶՄ ՈՐ ԵՂԵՒ ՅՈՅԺ ՍԱՍՏԻԿ
ՊԱՏԵՐԱԶՄԻՆ ԳԼԽԱՒՈՐ ԱՐՁԱՆ ՔՐՄԱՊԵՏՆ
ՈՐ ԿԱՅ ԱՅՍՐ 'Ի ԹԱՂՄԱՆ
ԵՒ ԸՆԴ ՆՄԱ ԱՐՍ ՀԱԶԱՐ ԵՐԵՍՈՒՆ ԵՒ ՈՒԹ
ԵՒ ԶԱՅՍ ՊԱՏԵՐԱԶՄ ԱՐԱՐԱՔ ՎԱՍՆ ԳԻՍԱՆԵԱՅ ԿՌՈՑ
ԵՒ ՎԱՍՆ ՔՐԻՍՏՈՍԻ։

"THE FIRST BATTLE FOUGHT VERY FIERCELY,
THE CHIEF COMMANDER IN THE BATTLE WAS ARZAN THE HEAD PRIEST,
WHO LIES HERE INTERRED,
AND WITH HIM ONE THOUSAND AND THIRTY-EIGHT MEN.
WE WAGED THIS WAR FOR THE IDOL KEISANEY
AND ON BEHALF OF CHRIST."

Here concludes the narrative of the religious war. Our historian, it appears, was an eye-witness to the scene he describes. This victory was celebrated by the Armenians with the greatest pomp and merriment. The heathen temples were razed to the ground, and the images of KEISANEY and DEMETR were broken to pieces. They were both made of brass. The length of the former was fifteen feet, and that of the latter twelve feet. The priests of the idols, with tears in their eyes, intreated the victors to put themselves to death, rather than destroy their mighty KEISANEY. Six of the priests were killed on the spot, for the resistance they offered to the Armenians. On the restoration of peace, the prince of the Seunies proceeded to the village of Kuars, and succeeded in persuading its inhabitants to forsake idolatry and embrace the Christian religion. Being duly prepared for baptism, they were conducted to the valley of Ayzasan, where they were baptised by St. GREGORY, and thus admitted into the fellowship of the Church of Christ. "The number of persons," says ZENOBIUS, "christened on the first of Navasard[*], including men and children, amounted to five thousand and fifty." Females, it appears, were excluded from this number, and baptised on another day, appointed for the occasion. Some of the heathen priests and their families, however, tenaciously adhered to the idolatrous practices of their forefathers. The paternal persuasions of St. GREGORY had no effect upon their minds. "Remember this well," said they to the Armenian princes, "that if we live, we will make you a recompense for your treatment; but, if we die, the gods will wreck their vengeance on you all on our behalf!" Hereupon the prince of the house of Angl ordered them to be taken to the city of Phaitacaran[†], where they were imprisoned and their heads shaved. The number of these prisoners amounted to four hundred.

It is impossible to know what was the number of this Hindu colony at the time of their emigration from India into Armenia. We are, however, certain, that from the date of their first settlement in the Armenian province of Taron to the day of the memorable battle, a period of about four hundred and fifty years, they must have considerably increased and multiplied, and thus formed a part of the population of the country. No vestiges of this Hindu race can, at present, be traced in Armenia, save the record of their exploits, handed down to us in the narrative of ZENOBIUS[‡].

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[*] ՆԱՒԱՍԱՐԴ *Navasard* is one of the ancient Armenian months, corresponding with the month of August. An account of these months is given by M. BROSSET in the *Nouveau Journal Asiatique* for December 1832, page 526.

[†] ՓԱՅՏԱԿԱՐԱՆ *Phaitacaran* was the capital of an extensive province of that name, where SANATRUK, the great Armenian Satrap, proclaimed himself king immediately after the death of TIRIDATES. It is situated on the confluence of the rivers Araxes and Kur.

[‡] Our historian was also called by the appellation of ԳԼԱԿ *Glak,* whom St. GREGORY appointed primate of the convent of ԻՆՆԱԿՆԵԱՆ Innaknian, which afterwards received the appellation of ԳԼԱԿ *Glak.*

III.—*Facsimiles of various Ancient Inscriptions.*

Fearing that many of the inscriptions with copies of which I have been favored by my mofussil correspondents, may be mislaid or lost sight of unless committed to print, I am led to anticipate the full explanation which many of them doubtless might receive from those who have learning, industry, and will, to decypher them, but want the necessary leisure at present to undertake the task,—by transferring them to the stone at once, and recording them in the Journal along with the notes that accompanied them, where they may be at all times available when accidental discovery may open a clue to their interpretation. Some indeed are of a promising nature, and have been in a great measure made out, while others have been alluded to in former Nos. of the Journal or in the proceedings of the Society, to which reference alone is all that can be offered. I must proceed in the inverse order of the plates, having numbered them without consideration.

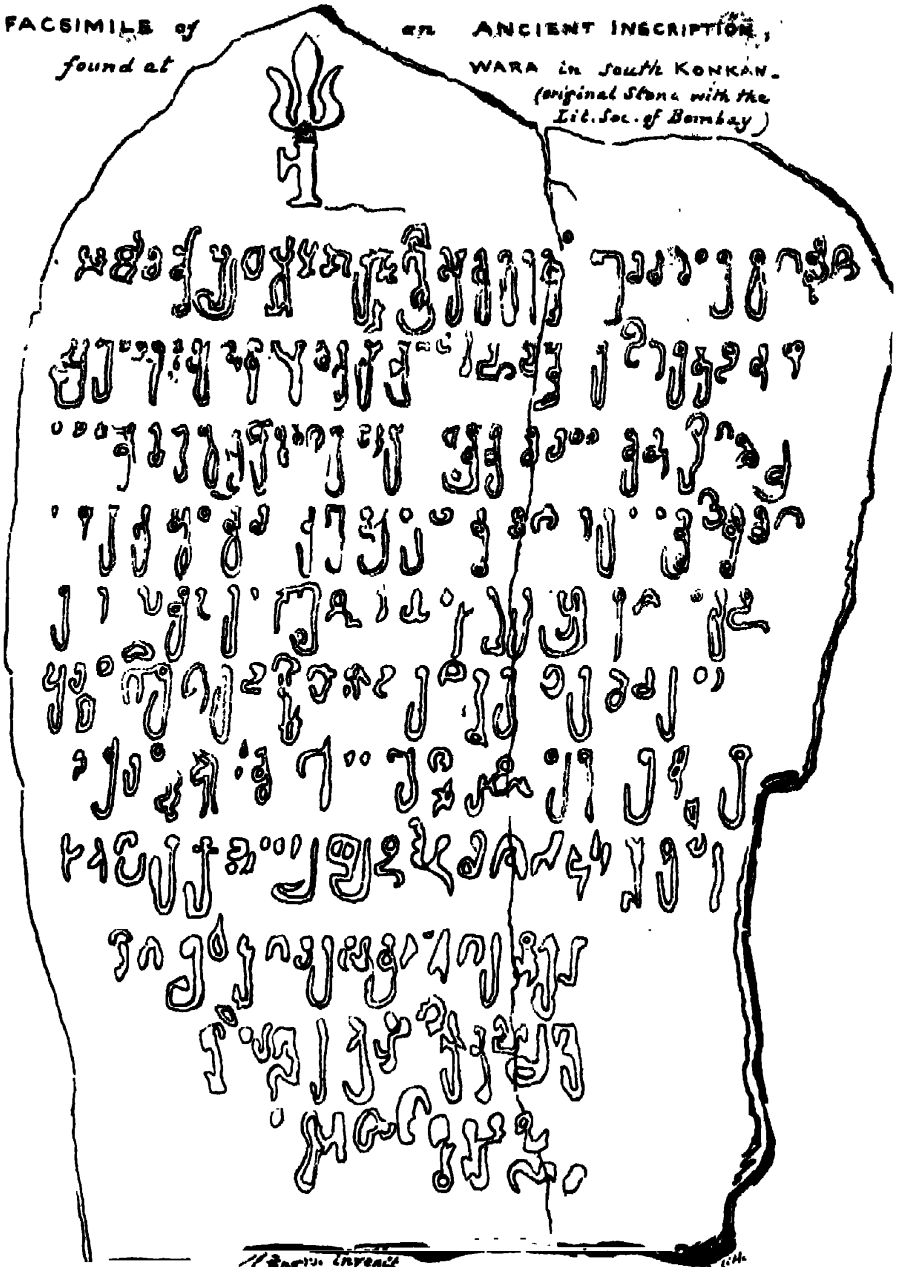
Konkan Inscription.

No. I. of Plate X. is the reduced *facsimile* of an inscription on a slab of stone from *Wara* in South Konkan, presented to the Bombay Literary Society by Captain T. JERVIS, of the Engineers, by whom it was supposed to be in the *Cufic* character. It was communicated to the Bengal Society by our associate the Rev. Mr. BATEMAN, in January, (see p. 58.)

Those who have noticed the series of ancient Hindu coins depicted in the November and December Nos. of the Journal of last year, will doubtless recognize in the present inscription the peculiar form of the Nágarí character on the Saurashtra group of coins. The *trisul* surmounting the inscription would indeed have been sufficient to negative the possibility of its Cufic origin. From the position of this symbol, which we must suppose to have been in the centre of the slab, it is probable that a third of the inscription on the left hand is broken off, which alone would prevent the possibility of coming at the purport of it. This is a pity on more than one account; for the initial invocation might have afforded a clue to a few of the letters, to the language, and to the sect of Hindus that erected the monument; although the latter may be considered to be sufficiently established by the symbol of Siva surmounting the legend.

The chief peculiarity of this form of alphabet is, that the tails of the letters are lengthened and turned up backwards in a loop. Abstracting this portion, the essential part of the letter resembles the Gujerátí type of Mr. WATHEN's inscriptions, (See vol. iv. p. 477.) The vowels also belong to the same type: the *y* is subjoined to the *s* and other

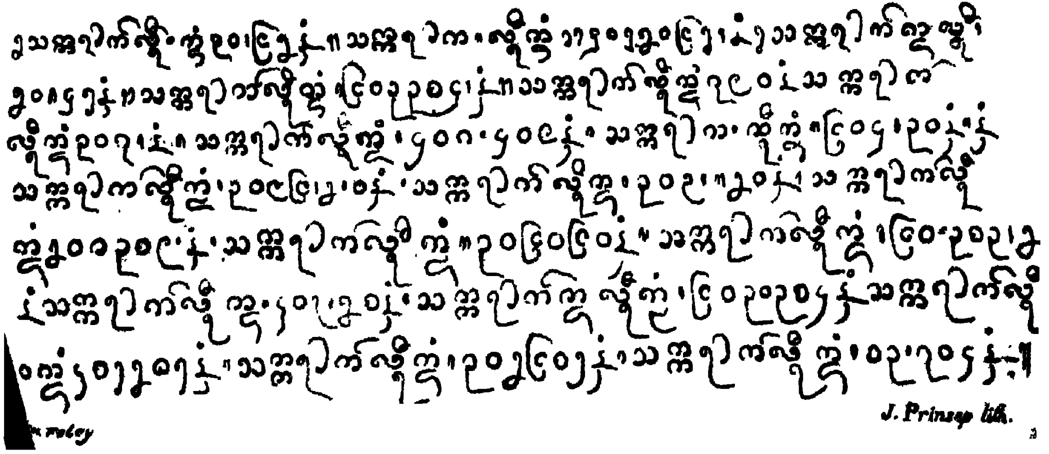
FACSIMILE of an ANCIENT INSCRIPTION, found at WARA in South KONKAN. (original Stone with the Lit. Soc. of Bombay)



Ct F. I. Jervis. Bomb. Engrs. invenit

J. P. lith.

Inscription at the Damatha Cavern, near Maulamyeng (Moulmein



Foley

J. Prinsep lith.

consonants in the same manner; and, in short, there can be little doubt that both are of one family, and that the monuments bearing these characters may boast of as high an antiquity as has been allowed to the coins, (Pl. XLIX. vol. iv. page 684,) of the Saurashtra group. Some of these, it will be remembered, have a trilingual symbol, in common with the oldest form of coins dug up near Sehâranpur; and the head on their obverse is supposed to be imitated from the Greek coins of Kodos, probably a Parthian successor of some of the petty Greek chieftains on the Indus. Other coins have a trident on the reverse.

In the first and third lines there appear to be numerals, which may be read ১১১• and ১১••, 1110 and 1100: the figure *one* being rather like the Bengálí than the Nágarí form. These however can hardly refer in any known era to the period assigned to the coins.

Moulmein Inscription.

No. II. of the same plate, is the inscription in the *Barma* character and *Talain* language found in the Damatha Cavern near Moulmein by Captain W. Foley, and mentioned in his paper, (page 274 of the preceding No.) I have appended a translation by Ratna Paula in a postscript to the same paper, but nothing can be made of such an enigmatical jumble of figures.

Chunar Inscription.

No. I. of Plate IX. is taken from a pencil sketch of a stone slab in the Fort of Chunar near Benares, by Lieut. A. Cunningham, Engineers.

This young officer, who during his short residence at Benares has brought so many facts and antiquities to light as to make me blush for my own inactive residence there, had some time previously sent me a Nágarí transcript of the same inscription, in its present mutilated condition, written out by a Benares pandit, who also supplied the missing part of the text from a copy taken, he asserted, some years ago, before the surface of the stone had peeled away. An imperfect copy of the same, as it formerly existed, was also found among the Fort Adjutant's records at Chunar. On comparing the three, however, many discrepancies were perceived, and the position of the erasures was not marked in the pandit's transcript. I therefore again wrote to Lieut. Cunningham, who proceeded to the fort and took the copy himself from the stone, whence the present lithograph is made.

Having such abundant materials for making out what appeared a most simple inscription, I entrusted the whole to a young pandit, late of the English class in the Sanscrit College, to put together and translate. He made several alterations in the Benares pandit's readings, and substituted what he considered would better fill up the gaps; the sense was, however, so completely jumbled by these *amendments*, that I was loth to trust the translation to print without first troubling our learned Vice-President, the Rev. Dr. Mill, to look it over: and it was fortunate I did so, as will be seen by the comment his valuable notes afford on the attempt of the Benares pandit! As for the Bengáli's version, it was so much worse as to be unworthy of notice.

I had first imagined that the Shahab ud-din, whose invasion and assault brings upon him the epithet of दुष्टात्मा (the wicked-minded and tyrannical *Yavana*,) must be the first Patán sovereign of that name, whose overthrow of Rája Banár of Benares in 1193, A. D., is circumstantially recorded in Ferishta. The date, however, which corresponds with Thursday, the 5th August, 1333, A. D., falls in the reign of Muhammed Shah; and Dr. Mill has succeeded in discovering the actual owner of the title *Shahab ud-din* referred to.

The inscription has some interest in a historical view, as supplying the names of three successive rájas of Benares in the 13th century, of which no clue is to be obtained from other sources. Neither local tradition nor history supply any information regarding the holy city subsequent to the overthrow of the fort by Cutb ud-din, until a cursory notice of it occurs as the site of an encampment, in Baber's Memoirs.

Dr. Mill's restoration of the text is as follows, placing the interpolations in smaller type. I have inserted his notes on the pandit's version, as affording an useful example of the caution necessary in such cases, and proving how utterly void of trust are the attempts of the pandits of the present day, unless they have to deal with one capable of understanding what they would foist upon the unsuspicious as faithful transcript and good sense.

Line on the stone. Verse. * ओं गणपतये नमः ।

1 I काश्यिपारे पुरा योऽभूद्देवको नाम नामतः ।
तत्सुतः सेवनो नाम मल्हणाख्यो महायशाः ॥
2 II.* सोऽधिपो यस्माद्विख्यातो विप्राणो भुवनाधिपैः ।
सुधीभिर्वेष्टितः शम्भोः पदपद्ममधुव्रतः ॥
3 III. तस्माच्चन्द्रगणो जातः *सदयो देवभक्तिमान् ।
सर्व्वराजगुणैर्युक्तो विश्वेशः पुरपालकः ॥
IV. स्वामिराजोऽनुजस्तस्य राजा जयति धार्म्मिकः ।
4 प्रस[न्नः सर्व्वभूताना]ं* [शासनश्च सतां]मुदे ॥
V. सहाबदीनाद्दुष्टात्मयवनेन्द्रमहम्मदा ।

सैराजो मि[खितोऽस]त्यो वेरिणापि कृपानिधिः॥
5 VI. गंगाराधसि*[तेनैव नुन्ना सेनापरो]र्व्वितः।
तत् श्रुत्वा च ततः क्रुद्धमजे [यारिमवेनृप ॥
VII. यत खं] प्रीतिभिर्लोकैः चेतः स्वानै [स]रक्षि[तुं।
6 *स्वामिराजादयो दुर्गं वीरा] संमर्द्दतो दि[षां ॥]
VIII. ततस्तु सर्व्वै प्रथिनोऽतीतास्ता हि[*भयोर्मेय ।
7 यवनानां तदा सेना तद्दुर्गं प्राविशच्छलात ।
IX. यस्मान्न]युज्यते सामात्यजद्दुर्गं कियद्दिनं।
8 ननु दानेषु वैरि[*भ्यो दत्तेष्वपि यथाचितं ॥
X. भूय]स्तानवितुं [प्रत्यक्ष तु रथ स स्वा]वकैरावृतं
संग्रामे परवीरदर्पंदलन· श्रीस्वामिराजोन्ट[प ।
9 *स्वाकान्तारमवेक्ष्य ष्वन्त मत]दोस्संज्ञ तुरुष्कं परं
सग्र[ामागम]नेखलस्य च पुनः तत्याज दुर्गं स्वयं॥
10 XI. तस्माद्दुर्गवर्तौ ग*त्वा स्थित्वा मत्वा च तत्कृपां।
ईहया पुनरागत्य चक्रे राज्यमकंटकं॥
संवत् १३९० भाद्रपदि ५ गुरौ सैराजदेवनप्तर
11 *ागतमलिकसहावदीनरक्षितं ॥

Translation

Om! Salutation to GANAPATI

I Of him who under the name of DE'VACA, reigned on the opposite coast to Kási (Benares), the son called SEVANA was as the sun in the firmament, greatly renowned

II That king being celebrated as illustrious by the sovereigns of the world, was ever surrounded by sages, ever devoted to **SAMBHU** [or SIVA], as the bee to the lotus

III Of him was **CHANDRAGANA** born, merciful, devout to the gods, endued with all kingly virtues, lord of all, guardian of the city, (Benares)

IV His younger brother SVÁMI Raja excels as a religious king, gracious to all creatures, and skilfully exercising government, to the delight of good men.

V By MUHAMMED*, lord of the hostile Yavanas [Moghals]

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* This was **MUHAMMED SHA'H**, the third Emperor of Dehli of that name, who succeeded his father **TUGHLEC SHA'H GHAIASH UD DIN**, A H. 725—eight years before the date of this inscription—celebrated for his frantic expedition to the

SHAHAB UD-DIN[*] and the rest, though an enemy, was SAIRÁJA[†], the treasure of benignity, employed as prime minister.

VI. (By him) from a (far) country (was an army sent to the bank of the) Ganges. (The king) on hearing of this, (believed) that an angry and invincible (enemy was approaching.)

VII. Upon this (SVÁMI RÁJA and other brave men), went with horses and men, and sound (of arms, &c.) to defend from the assaults of the (foe, their fort) [Chunar.]

VIII. Then did all the inhabitants sleep secure, for those (waves of terror) had passed by: (and then the army of YAVANAS entered their fort by surprise or stratagem.)

IX. And since pacification[‡] was not expedient, he [SVÁMI RÁJA]

Chinese border, his attempt to remove the seat of empire from Dehli to Doulatábád, his application for investiture from the Khaliph of Mecca, and many extravagancies which caused his sanity to be suspected. [The name Yavana, as is well known, is generally applied by the Brahmins to their Mahometan conquerors; though arising from a misconception of the term as occurring in their own ancient books, where it undoubtedly refers to the Greeks, whom Persians, Phœnicians and Hebrews always designated by the same name.]

[*] The SHAHAB UD-DIN here meant is not the emperor OMAR SHAHAB UD-DIN, who succeeded his father ALA UD-DIN, A. H. 716, and was murdered after a short reign of three months; but must be one to whom, as FERISHTA tells us, MUHAMMED SHA'H gave the title of MALIC (by which he is called at the close of this inscription) and a place called Nusarí as a jaghir. FERISHTA's words are وملك شهاب‌الدين را ملك افتخار خوانده نوساري را بجاگيرش مقرر كرد Further on in the life of the same Emperor MAHAMMED IBN TUGHLEK, and nine years after the date of our inscription, that at the close of a successful expedition to the Dekhan he gave to Sultan SHAHAB, who is most probably the same person, the title of NASARET KHA'N, and the government of Baider on the Indus, yielding annually the revenue of a crore of rupees وشهاب سلطان را نصرتخان خطاب داده ولايت بيدر حواله او نمود و اقطاعات آن نواحي را بصدلك تنكه مقاطعه باو داده All this is confirmatory of what is apparent from the inscription, viz. that this SHAHA'B UD-DIN was the general of the army which MUHAMMED SHA'H or his Hindu minister sent against the Rája of Benares.

[A celebrated Cazi named SHAHAB UD-DIN is commemorated by ABUL FAZL, who was flourishing at the time of TIMUR's invasion at the close of the 14th century. But this is somewhat too late.]

[†] This SAIRA'JA I do not find mentioned by any historian of the time.

[‡] The allusion is here to the several modes of dealing with an enemy enumerated in MENU VII. 198, viz. सामन् *pacification,* दान *presents* भेद *sowing dissensions;* either of which three the Hindu legislator prefers in respect of

abandoned the fort for some days; only (presents) having been given (to the enemy, according to usage.)

X. (But once more) to protect his own people did the noble king Sváḿi Rája, the crusher of the pride of alien heroes in fight, (ascend his chariot)* surrounded by applauding heralds: but (having perceived) the great Turkish warrior surnamed (Sata) dos [or him of the hundred arms], at the approach of the hateful one in battle, he again left the fort of his own accord.

XI. Thence having approached *Bhagavati* [the goddess Anna Purna Devi at her city Benares,] having abode there, and meditated on her benevolence, thence returning with care, he established his kingdom here free from all thorns of trouble.

Samvat 1390, in the month Bhadra, fifth day of the waning moon, [Aug. 5, O. S. A. D. 1333,] on Thursday, was the kingdom set free from Malic Shaháb ud-din, acting under the protecting favor of Sairája Deva aforesaid.

Remarks on the Sanscrit text.

Verse I. The Benares Pandit's reading काश्यांस्थानेषु राजा is much worse in sense, beside being inconsistent with the evident letters of the inscription, which are as exhibited above. The यो is required in Sanscrit construction by the तत् of the next line.

II. The B. P.'s reading सोऽक्षिपः स च विख्यातो विश्रुता वसुधाधिपेः though somewhat smoother in metre, is inferior in every other respect to this, which (except for the indistinctness of the रा in विराजो and of the syllables वनाधि is clearly marked on the stone.

In the second half, the B. P.'s reading शम्भुपाद् is inconsistent with the characters on the stone.

III. In the last quarter of this verse, I wish I could read with the B. P. विश्वेशपुरपालकः in one compound; Visvésa-pura being a well-known name of Benares.—But the *visarga* is too clear on the stone to admit of that reading.

IV. In the second half of this verse only the beginning प्रसु and the end युद्धे with the exception of an ा in the middle, is clearly legible. My conjectural reading of the rest in small characters is accommodated to this—whereas the B.

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prudence, to the fourth युद्धं *giving battle;* and our prince Sva'mi Ra'ja seems to have been of the same mind. The meaning here is however that to the first, *pacification*, he preferred the second, of buying off the enemy. If for ननु we read नतु, it would mean that he abstained from both of these methods: if we read नाना, it would mean, on the contrary, that he was profuse in his presents while he abstained from making peace. The first seems to me the best reading of the three: and all of them more probable than मूकं which is the reading of the Benares pandit.

* I find no Moghul or Afghan warrior to whom this name can be considered as necessarily applying. The syllable शत् sata is conjecturely supplied to fill a hiatus on the stone.—W. H. M.

P.'s सुधर्माः शास्ति दुर्गेऽस्मिन्परा प्रवणमानसः is *altogether* gratuitous and irreconcilable with the yet remaining letters of the verse.

V. The B. P.'s reading of this verse :

सहाबुद्दीनदुष्टात्मा यवनो दुष्टदुर्म्मदः ।
असौ महाराजमित्रो वैरिणोऽपि कृपानिधिः ॥

has only the advantage of mine as to the antepenultimate syllable of the first half, viz. the 2nd दु being somewhat more like what appears on the stone. In every other respect where there is any difference, any one may see how entirely he varies from the characters there visible, beside being incorrect in grammar and prosody, and quite unintelligible. Only three syllables of mine are conjectural, in a place where the stone is broken.

VI. All of this verse, which is not distinguished by small letters, is most clearly traced on the stone : but the B. P. has retained nothing of it but the three first syllables of the second line, (in which also he has thrust in another syllable with a *visarga* without warrant) in his reading, which is—

तदा सहाट् महातेजाः शास्ति साहमहम्मदः ।
ततः श्रुत्वा स यवनः तत्कीर्त्तिं कोपसंयुतः ॥

most entirely gratuitous ! beside that it annexes the first to sl. 5, and begins the 6th with the other.

VII. VIII. In these two verses, between which there is an interval in a broken part of the stone sufficient to contain a half-sloka or line, and which may throw some reasonable doubt as to the precise divisions of the slokas or distichs, the B. P., who divides differently from me, has not attempted to retain any thing of the yet remaining large characters on the stone, except in the first line, and the beginning of the last but one ; while any one who compares his reading with mine, will see how much more he varies from his original. His reading is in five lines, as follows :

सहस्राशीतिभल्लिकैः धनुर्वानैरसंख्यकैः ॥ [Here वाण *an arrow* is misspelt.]
आगत्य दुर्गं ववधे मनुष्यानेषु सर्वतः । [No संमर्द्दो as on the stone.]
प्रविवेश च तं दुर्गं सर्व्वैश्च सह सैनिकः ॥ [A false concord here.]
ततस्तु सर्व्वं स्वस्थानं समाक्रान्तं प्रयत्नतः । [All but the first syllables quite incompatible with the stone.]
अपजादेशमाकर्ण्य स्वामिराजः पुनः स्वयं ॥

IX. This the B. P. read quite differently ; but any person comparing his two first lines with mine, may judge which is the nearest to the actual inscription. His third line is altogether gratuitous.

ततस्त्याज सामात्यः तं दुर्गं स कियद्दिनात् ।
नूनं स तेषु देशेषु साम्राज्यं कृतवान् स्वयं ।
तत आगत्य यवनो जग्रे राज्यं स दुर्मतिः ॥

X. In this sloka, which is in the lyrical measure called *Sárdúla vikríditem*, the B. P. has made the following very serious mistakes, 1st, making its *second* páda or hemistich the *first*, (reading it otherwise quite correctly) to the exclusion of all the legible syllables of the first páda, whose place in the measure is so palpable, viz. the 3rd, 4th, 5th, 6th, 15th, 16th, 17th, 18th and 19th or last, which are on the stone clearly as they are here represented in large letters [having gratuitously supplied their place by a 3rd *Anustábh* line to verse IX. !] 2ndly.

Filling up the place of the 3rd and 4th pádas by a crowded *three* of his own making entirely, except the eight last syllables of the last—though so much more of them are *clearly legible* on the stones at their proper intervals—just as I have placed them in the midst of the conjectural supplements. The B. P. has

संग्रामे परवीरदर्पदलनः श्रीस्वामिराजो नृपः ।
पूर्वं प्राप्य सहोदरादरवशाद्राज्यं गुणी धार्मिकः ॥

(This 3rd páda has a glaring false quantity.)

पश्चात्प्राक्तनस्वीयकर्मवशतो दौर्भाग्यभावोदयात्
षाड्गुण्यादि गुणान्वितोऽपि स पुनः तत्याज दुर्गं स्वयं ।

XI. This last verse, which is *Anustabh*, like the nine first, is read by the B. P. as I read it, except that the 2nd quarter is with him संस्थितस्य कियद्दिनं quite unlike the stone, and that the 3rd he begins differently, viz. पश्चात्तत्पदमागत्य। borrowing to this place what he had omitted in the 2nd. The stone gives clearly throughout what I have written above.

After the date and the word गुरौ, the B. P. has gratuitously expanded the rest into a sloka, as follows:

गुणसौ राजदेवोऽयं शरणागतपालकः ।
सर्वदीनयवनः कृतो येन सुरंजितः ॥

I will add, that the inscription, as it is now legible, affords no countenance to the B. P.'s supposition, that the discreet SVA'MI RA'JA acted under his elder brother CHANDRAGANA. He rather appears to have been his successor.

W. H. MILL.

Barahát Inscription.

No. III. of the same plate, is the inscription from *Barahát* in *Garhwal*, presented, in duplicate, to the Society by the Commissioner, Mr. TRAILL. This inscription also has been deciphered in part by the Rev. Principal of Bishop's College, who has kindly communicated its contents to me in the following letter:

"I have the pleasure of sending one of the *Kemáon* inscriptions, that of *Barahát* in *Garhwál*.

It opens with the invocation स्वस्ति श्रीः *Svasti Srí*, addressed apparently to a prince, and the first line contains the words यस्य यत्र शृङ्गे यच्छृङ्गोच्छ्रितं शोभं 'whose and where is a palace which is on a lofty peak and splendidly magnificent.' The second line of the inscription is a turgid verse in the *Sárdúla vikrídita* measure, as follows:

पुत्रस्तस्य महत्संख्यपृथुभुक्सेनोन्नतावस्थलः
कामत्यागमयैरनस्रधनुरप्यासीन उद्यंस्तनः ।
मात्माये तु य दृत्युदारचरितः सद्धर्मधीरः स तां (understand सेनां)
सन्तोषेण च धारयन्नवनीं मध्यमकारागतः ॥

"His son, whose ample condition was exalted by a numerous army, devouring the juices of the earth like the sun of summer, then arising sat on the throne, and even with his bow unbent, still ruled with sage counsels, and the abandonment of all selfish passions. He who was originally by name *Udára-charitá,* (the man of generous deeds,) being skilled in all holy duties, did even thus at once, as the best of the lords of power, reduce to fragments the army opposed to him, though crushing all other adversaries, chariots and all."

This is the whole of the second line. The third and last which is in prose begins प्रीतः प्रीतस्य "the beloved son of a beloved father, and ends with the words ...... तिलकं यावदङ्के पिधत्ता तावत्कीर्त्तिः" सुकीर्त्त्योरचरमथ तस्यास्तु राज्ञः स्थिरम् "As long as the sacred mark remains in the body, so long has the glory of these two illustrious ones (father and son) been concealed: but henceforward may the immortality of this king be unshaken!"

The meaning is not very good, and the word सुकीर्त्तः for Illustrious, is unusual, if not semi-barbarous, in its formation; but I can make nothing better of it, neither can I spell out the father's name from the strange characters of the first line. The second one is the only part on which I have no doubt. W. H. MILL.

Iskardo Inscription.

No. 3 *of Plate IX.* is a copy of the inscription on a granite rock near Iskardo, the capital of Little Tibet, taken by Mr. VIGNE, the English traveller, who sent it down through Captain WADE in hopes that M. CSOMA DE KÖRÖS would be able to decypher it.

Being found under an image of Buddha, it may be concluded that this inscription is but an extract from some of the sacred volumes of his followers; but it is in too imperfect a state for M. CSOMA to be confident of the rendering, although a large portion of the letters may be read with ease and certainty. Their accurate form would pronounce them to have been copied by an artist, if not by one acquainted with the Tibetan alphabet.

Ajunta Inscription.

No. 4 *of Plate IX.* This mutilated inscription is from the caves of Ajunta. I am indebted for it to Mr. RALPH and Capt. GRESLEY, of Aurangábád, who paid a visit to those celebrated excavations last year, and I am not aware that this particular inscription has been yet published.

Mr. RALPH states that it was found "not in the largest Bauddha cave, but in the first which we inhabited, and the one where a square was formed by four pillars each way. The letters were on the right hand of a doorway of a small apartment leading into one containing the figure of BUDDHA; but here he was not represented with the two African statues of attendants, nor is this the cave where the Grecian helmets are found. The rough sketched countenances which are placed under the writing are in keeping with those that cover the whole of the little chamber, at distances of two or three inches from one another —these appear to be portraits of disciples seated,—all half lengths."

Captain GRESLEY has favored me with a ground plan of the cave from memory, but as accurate measurements were taken by Dr. BIRD in 1828, for Sir JOHN MALCOLM, for the Royal Asiatic Society, it is unnecessary to insert it.

"The large cave, 40 feet square within the eight columns, has more brilliant figures in fresco painting than any I have visited. It is the one which contains what some have miscalled the *zodiac,* a portion of a large circle on the wall outside the first cell on the left hand on entering the cave-temple, where many small figures may still be traced." Some damage has been done since 1828, and it is the opinion of these travellers that time and rain will soon render the caves altogether inaccessible.

The first letter of the inscription is sufficient to shew to what alphabet the Ajunta writing belongs: it is precisely the *y* of the Allahabad and Gujerat inscriptions; the second letter is *dh* of the same alphabet, and the third is the *m* of the coins of the same period, differing slightly from that of both the inscriptions above named.

. The collocation of these three letters, agreeing exactly with the commencement of the sacred text so constantly found on all the ancient Buddhist images lately brought to notice from Ava, Benares, or Tirhút, *Ye dharma,* &c., led me to look for the remainder of the stanza; but it was evident that the text would not bear such a construction. Perhaps the Rev. Mr. STEVENSON, whose attention has been successfully engaged on the Carli inscriptions, than which however the present seems considerably more modern, may be able to fill up the chasms and rectify the mutilations of this short legend, if indeed it be worth while to do more than recognise and record the style of *Nágari* to which it belongs.

No. 5 *of Plate IX.* is merely a word in an inscription from the *Behtari* column, *Ghazipur* district, concerning which, as it occurred on the Allahabad column, a difference of opinion existed: Captain TROYER reading it *Yagna Kacha,* and Dr. MILL, *Ghatot Kacha:* the latter is evidently the most probable, if it be not quite certain; but I hope to be able to insert the whole inscription (taken down with great care by Lieut. A. CUNNINGHAM, Engineers) in my next number, with a full interpretation by the Rev. Principal of Bishop's College. I had lithographed it as Plate VII. to precede the present two, but the translation was not ready for insertion. J. P.

IV.—*Descriptive Catalogue of Terrestrial and Fluviatile Testacea, chiefly from the North-East Frontier of Bengal. By* W. H. Benson, *Esq. B. C. S.*

The species of land and fresh-water shells described in the following pages, form a collection, chiefly made in the hills on the N. E. frontier, which was purchased by the Asiatic Society of Bengal in 1833. One of the land shells, *Scarabus triangularis,* and two *Neritinæ* and a *Melania* among the fluviatile shells, inhabit the jungles and streams of the Gangetic Delta, and were probably collected on the route to Sylhet. Several shells belonging to the genera *Cerithium, Cancellaria, Planaxis, Phasianella,* and *Pedipes,* which occur in the collection, have been omitted, as being, in all probability, marine, or semi-marine productions procured from the embouchures of the Deltaic rivers.

1. *Vitrina Gigas.* Testâ tenui, corneo-virente, ovato-depressâ, auriformi, velociter crescente, suprà planatâ, rugis concentricis et striis radiatis decussatâ; subtus tumidâ; ultimo anfractu valde ventricoso, penè totam testam efformante; aperturâ transversâ, rotundato ovatâ, prægrandi; labio valdè arcuato. Diam. 1.15 poll.

This shell is so flattened, and enlarges so quickly, that it has very much of the appearance of one of the *macrostomata,* to which I referred a specimen from the caves of Sylhet, recently fossilized with calc-tuff, when I first saw it. It has only two whorls exclusive of the apex, and differs in size, in the depression of the spire, in the very arcuated left lip, and the more extended mouth from the European species *V. elongata.* I believe that it is the first shell truly belonging to this genus which has been ascertained to inhabit India. Since I became acquainted with it, I have met with a second species alive, adhering to dead leaves at the roots, and to the lower part of the trunks of trees in the teak-wood attached to the Botanic Garden of Calcutta; but the characters of the animal restrict it to the genus *Helicarion* of Cuvier. Whether *V. Gigas* belongs to Cuvier's *Helicolimax* or to *Helicarion,* cannot be ascertained without an examination of the animal; I therefore leave it in the original genus as defined by Lamarck.

2. *Nanina decussata.* Testâ corneâ, discordeâ, sub-depressâ, umbilicatâ; spirâ exsertiusculâ, obtusâ; anfractibus septem suprà planatis, ultimo obtuse angulato; epidermide suprà argutè decussatâ, infrà radiatim striatâ; apertura transversâ, lunatâ. Diam. 1 poll; axis 0.35

On a cursory inspection of this shell, I erroneously considered it to be a variety of the species "*vitrinoides*" Deshayes, belonging to Mr. Gray's genus *Nanina,* (Zool. Proceedings, 8th July, 1834,) which I indicated under the name of *Macrochlamys* in the first No. of the Journal of the Asiatic Society for January 1832, pp. 13 and 76, and which I altered to that of *Tanychlamys* in a paper on the genus read before the Zoological Society in August 1834. Mr. Gray's characters, drawn up from specimens preserved in spirits, and from General Hardwicke's drawings, having the advantage of priority of publication, his name, although inexpressive, will necessarily be adopted. Several independent observers have united in stating the necessity of separating this genus from *Helix*, on the characters of the animal; witness the observations of Lieut. Hutton, Journal of the Asiatic Society, vol. iii. p. 83.

The species under review differs from *N. vitrinoides* in sculpture, has a more exserted spire than the generality of specimens of that shell, has a more angular periphery, is of a lighter colour, and, possessing the same number of whorls, is larger and of a thicker substance. The epidermis is apt to peel off the under side.

I have a third species belonging to this country, which I lately took at the foot of the Rajmahal hills. It differs in its smaller size, its lighter colour, and in the form of the aperture from both *vitrinoides* and *decussata*, and from the former it altogether differs in its habits even when inhabiting the same spot, abounding on shrubs and bushes, while *N. vitrinoides* is confined to the ground, to rocks, and to brick work.

3. *Helix plectostoma*. Testâ reversâ, depresso-conoideâ subtùs tumidâ; spirâ exsertiusculâ; anfractibus suprà planatis, radiatim plicatis, rugis transversis decussatis; ultimo angulato, angulo subtùs marginato. Aperturâ lunatâ, plicâ, (ut in Helice personata) interdum inconspicuâ, ultimo anfractui adhærente; umbilico profundo, anfractus plerosque exhibenti. Diam. 0.35 poll. paulo plus.

This shell has a salient plate on the penultimate whorl connecting the two extremities of the peristome, as in *H. personata*, but differs from it in its other characters. The peristome is more rounded than in *H. Cocyrensis*, the spire more conoid, and the satures less conspicuous. It belongs to the subgenus *Helicodonta* of De Ferussac, but in the angularity of the periphery it approaches to *Helicigona*.

4. *Helix Oxytes*. Testâ ferrugineo-corneâ, depressâ; spirâ convexâ, apice planato; periphæriâ acutâ; anfractibus obliquè subplicatis, suturis non excavatis; peristomate subreflexo; umbilico lato et profundo anfractus usque ad apicem exhibenti. Diam. 1.8 poll.

In form it exactly resembles *H. acumen* of Dalmatia, but exceeds it in size, and differs in colour, in its sub-reflected mouth, and in sculpture, the whorls being destitute of decussating striæ and of the polish which adorns the latter. It belongs to De Ferussac's groupe of *Helicigona*, and to the 2nd division, *Vortices*. It would stand as a *Carocolla* of LAMARCK. Whorls six, exclusive of the apex.

5. *Helix climacterica*. Testâ subdepressâ, subtùs tumidâ; spirâ sub-conoidea, gradatâ; anfractibus omnibus angulatis, suprà planatis, argutè plicatis; apice obtuso. Periphæriâ angulatâ. Peristomate acuto, non reflexo. Umbilico nullo. Diam. 0.75 poll.

This species resembles *H. barbata* of Cephalonia in its general habit and in the peculiar form of its spire, which rises like a flight of steps; but the apex, though obtuse, is more exserted, and is destitute of the flattening observable in the Cephalonian species. Whorls eight, exclusive of the apex. It belongs to *Helicigona* of DE FERUSSAC, and to its first groupe, which is destitute of an umbilicus.

6. *Helix Serrula*. Testâ subdepressâ, sub-conoideâ subtus convexâ; apice acuto; anfractibus suprà confertissimè radiatim plicatis, marginatis, marginibus elevatis; ultimo anfractu infrà læviore, periphæria marginatâ, serratâ. Umbilico profundo, mediocri; peristomate acuto. Diam. 0.55 poll.

Whorls seven, exclusive of the apex. This is also a *Helicigona*, 2nd groupe. It is allied to a new unnamed species which I have from Malta, but has a smaller umbilicus in proportion, and a more acute spire. It is also larger.

7. *Helix tapeina*. Testâ sub-conoideâ, suprà convexâ, subtùs tumidâ; epidermide minutissimè corrugatâ; periphæriâ angulatâ, peristomate non continuo, subreflexo. Umbilico mediocri, profundo; omnes anfractus exhibente. Diam. 0.6 poll.

Whorls seven, exclusive of the apex. It is allied to *Carocolla Lapicida*, but differs in sculpture, in its discontinuous peristome, less angular periphery, and more conoid spire. The aperture is also more open. It belongs to the 2nd groupe of *Helicigona* of DE FERUSSAC, and to the genus *Carocolla* of LAMARCK.

8. *Helix delibratus* Testâ depresso-planâ, subtùs tumidâ; epidermide corneâ deciduâ; anfractibus transversè striatis; aperturâ transversè rotundato-ovatâ; peritremate vix continuo, reflexo; umbilico lato, anfractus plerosque exhibente. Diam. 0.9 poll.

Whorls four. Of the same type as the European species *H. cornea*, from which it differs in colouring and in the form of its spire, which resembles that of *H. deplana* of Croatia; but from this species it differs in the form of the mouth, and in the markings, as well as in its more open umbilicus. From *Helix granulata* (mihi) of the Western Provinces, it differs in the more transverse mouth, more flattened spire, and wider umbilicus, in its plainer colouring and greater size, and in the want of that minute shagreened appearance, under the lens, which renders that species so remarkable. It belongs to the subgenus *Helicella* of De Ferussac. The epidermis scales off like that of the *Solenes*, whence the trivial name which I have conferred upon it.

9. *Helix Cestus.* Testâ subdepressâ, corneâ vel fuscescente, radiatim striatâ, subtus convexâ, perforatâ; spirâ sub-conoideâ; apice obtuso; ultimo anfractu sub-angulato, fasciâ unicâ rufo-fuscâ, mediâ, reliquis fasciâ saturali cinctis; peristomate sub-reflexo. Diam. 0.65 poll.

Whorls five. *H. cestus* approaches in form and colour to a species which I possess from the Tyrol, and which is marked "*H. zonata,*" but which does not agree well with Lamarck's characters of *planospira*, of which he gives De Ferussac's *zonata* as a synonym. It differs from it in not having a white or a much reflected peristome. It belongs to the sub-genus *Helicella.*

10. *Bulimus citrinus.* Lamarck.

This is the reverse variety of a handsome shell, of which South America is recorded as the habitat by Lamarck. It is perforated, (of which character he makes no mention,) and of an uniform yellow, without bands or marks, and being weathered, no polish is observable. Length one inch.

11. *Achatina tenuispira.* Testâ elongato turritâ, corneâ, longitudinaliter striatâ, versus apicem attenuatâ, columnari; anfractu ultimo interdum fasciis quibusdam albidis transversis ornato; suturis impressis; apice obtuso. Long. 1 poll. circiter. Lat. 0.55.

This *Achatina*, belonging to De Ferussac's subgenus *Cochlicopa* and to his groupe of *Hyloides*, is remarkable for the attenuated columnar form of the terminal whorls of the spire.

12. *Achatina crassilabris.* Testâ turrito conicâ, lævi, corneâ, longitudinaliter striatâ; anfractibus convexis, suturis excavatis; labro intùs incrassato; columellâ præarcuatâ; apice obtuso. Long. 0.7. Lat. 0.3 poll.

This shell has the habit of a Ceylon species which I believe to be *A. nitens* of Gray. It differs in greater size, in its incrassated outer lip, in its somewhat more ventricose form, and in its sculpture. It approaches to Swainson's genus *Achatinella* in the arcuation of the columella, but differs in the absence of the thickened pliciform termination to it, and in having the incrassation quite at the edge of the outer lip, instead of removed to a little distance within it.

13. *Clausilia loxostoma.* Testâ sinistrorsâ, fusiformi, medio ventricosâ, corneo-grisescente; anfractibus convexis, lævigatis, striis obsoletis; suturis confortissimè crenulatis; aperturâ elongatâ obliquâ, bi-plicatâ, suprà angustiori, infrà dilatatâ peristomate reflexo; columellâ præarcuatâ. Long. 0.85 poll.

Out of a collection of 32 European *Clausiliæ*, I find none with a similar obliquity of mouth, from which character I have named the species. The outer lip projects beyond the plane of the aperture. The crenulations of the sutures differ altogether from the papillary appearance which is common to several species, such as *papillaris*, *alboguttata*, &c., and they are not elongated as in *C. nitida*.

14. *Scarabus triangularis*. Testâ compressâ ovato-conica, ætate subtriangulari, cornea, fasciis castaneis plurimis interdum obsoletis cinctâ, rugis longitudinalibus salcisque transversis, distantibus, interruptis decussata. Spirâ acutâ breviori; suturis obsoletis. Anfractûs ultimi varice saliente lamelliformi. Aperturâ quadridentata, biplicata; dentibus, uno insuper columellarium, tribus super costulam introlabialem sitis; plicâ unâ columellarii duplici, pandatâ, alterâ columellæ recurvâ, parvâ. Umbilico lineari, transversali, penè clauso. Length 0.9. Breadth 0.65 inch.

This shell, independently of its form, sculpture, colouring, and acute varix, may be at once distinguished from *Scarabus imbrium* by its peculiar umbilicus; that feature being rounded and perforate in the Malassan species. The number of teeth on the rib, which is situated at some distance within the outer lip, is very variable, ranging from three to seven; of these three are always more prominent. In weathered specimens the subordinate denticulations are generally unobservable. Occasionally the whole of the shell is of a dark chestnut colour, with obscure bands of a more saturated colour. In his Synoptical table, DE FERUSSAC mentions two species from Bengal, *S. plicatus* and *S. Petiveri*, both distinct from *S. imbrium*. As he gives no description, I am unable to say whether our shell is identical with either or both: the latter contingency may possibly be the case, considering the great difference of form observable between young and aged specimens, and the uncertainty attendant on the species *S. Petiveri*, which appears to have been established solely on the inspection of a plate, no reference being made to any museum.

All the specimens of the shell in the collection are weathered, and in that state appear of a livid purple colour; this circumstance was, however, amply compensated for by an excursion which I made with Dr. PEARSON to the alluvial island opposite to Fort William, in quest of objects of natural history, during which that gentleman discovered the live animal under decayed vegetation, and under bundles of the *hoogla* grass cut down for sale. From these retreats, which it occupied in company with the amphibious *Assiminia Gangetica*, we made a large collection in a short space of time. I have searched for it in vain on the neighbouring mainland, in the vicinity of the Bishop's

College and the Botanic Gardens, as well as on the opposite side of the river; but specimens of deserted shells were taken by a friend, as low down as the junction of the Damoda with the Hooghly.

It is only of late that French naturalists have verified the terrestrial habits of the genus. The present species is much distressed when thrown into water, and crawls out of it when immersed. Its decidedly amphibious companion, *Assiminia Gangetica,* I have met with, on dewy mornings, more than a furlong from the river's bank, crawling among moist grass.

15. *Cyclostoma involvulus.* (MULLER.)

This elegant species, which is abundant in a living state at Rajmahal, Secrigally, and Patharghâta in Behar, attains a large size in the Silhet collection. When adult it is always possessed of a beautiful orange colour on the peristome. It is *Cyclostoma torquata* of Lieut. HUTTON, J. A. S. vol. iii. page 82, and is the species alluded to by me in vol. i. page 12, in my remarks on the genus *Pterocyclos.*

16. *Cyclostoma zebrinum.* Testâ albidâ, strigis plurimis rufocastaneis, angulato-flexuosis pictâ, spirâ depressiusculâ, acuminatâ; anfractibus plicis paucis transversalibus distantibus, ultimo rugis undulatis longitudinalibus sculptis; carina mediâ subacutâ. Aperturâ amplâ, peritremate reflexo; umbilico parvo. Epidermide crassâ, fuscâ, plicis longitudinalibus, his setis fortibus munitis, instructis. Diam. 10.35 poll.

I was at first disposed, from a consideration of the habit of this shell, to view it as a variety of a Tenasserim shell, described by Mr. G. B. SOWERBY in the 5th volume of the Zoological Journal under the name of *Cyclostoma perdix;* but a careful comparison with specimens which Mr. SOWERBY had kindly presented to me, has enabled me to distinguish it as a separate species. It differs in its sculpture, in its more developed keel, more contracted umbilical cavity, and in the possession of a singular epidermis, of which Mr. SOWERBY's specimens of *C. perdix,* though one was taken alive at Tenasserim, appear to have been destitute. In the latter species the markings are white mottled on a chestnut ground; in *zebrinum* they consist of distant zigzag flames of light chestnut on a white ground.

17. *Pterocyclos hispidus.* Spiraculum hispidum, PEARSON, Journal of the Asiatic Society, vol. ii. p. 391.

The acquisition of several live specimens of this genus (established by me in the first No. of the Journal) during the last rainy season, at the hill of Patharghata in Behar, where I first met with dead specimens of *P. rupestris,* enables me to disprove the conjecture of Dr. PEARSON that a branchial apparatus or projecting syphon is attached to the neck of the animal, as well as to confirm its affinity with the genus *Cyclostoma*, with which Mr. Sowerby has classed it. The name originally annexed to the genus was altered by Dr. Pearson, on insufficient grounds, as, independently of the violation of received rules of nomenclature*, of the existence of the tabular appendage in perfection in only one species of the genus, and its non-existence in others, the new name tended to convey an erroneous impression of the use of the anomalous excrescence observable in the shell of *P. hispidus.*

Dr. Pearson assumes that the specimens of *P. rupestris* from which the characters of the genus were taken, were immature shells, but a strict search in the habitat of the species, and the acquisition of 16 specimens of different ages and growth, of which 12 bore all the marks of being adult, dispelled all doubt of the obtainment of the perfect shell. The retromitted and retroverted tubular wing, affording an index of a former mouth, and which does not appear to have been accompanied by a reflexion of the peristome, exists in that form in *P. hispidus* only, and the sinus under the wing which crowns the final aperture is never so strongly marked as in the other species, bearing more resemblance to the channel under the wing of Gray's *Cyclostoma Petiverianum*, which shell indicates the passage to the Genus *Cyclostoma*, not only by this feature, but by the intermediate form of its umbilical cavity, and its operation.

A comparison of the animal of *Pterocyclos* (my four living specimens of which I assumed to be female, from the absence of the exserted organ so conspicuous on the neck of the male *Cyclostoma)* with that of *Cyclostoma involvulus* shewed only the following differences. In *P. rupestris* the mantle is sinuated, to correspond with the sinus at the crown of the aperture, and its edges are reflected over the edges of the sinus, but there is no organ projected through it by the animal, nor does the mantle line the interior surface of the wing. No organ likely to occupy the sinus is observable either when the animal is crawling or when it is drawn out to its fullest extent. The foot is shorter in proportion than that of *Cyclostoma,* hardly appearing beyond the disc of the shell when the animal is crawling, and the curious cup-shaped operculum is received into the wide vortici-form umbilicus of the shell, which it almost fills, whereas the thin flat operculum of *C. involvulus* is carried behind the shell.

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* In conferring generic names it is an obvious rule that the part should not be put for the whole, by designating the genus from an organ, without a change of termination, or the addition of a distinguishing epithet. The circumstance of the feature being peculiar in the family to which the groupe belongs, will not justify a departure from the rule; were a relaxation from it allowed in one instance, we might be called upon to recognize an anomalous form among the acephalous mollusca (to suppose an extreme case) as the genus "Caput!" In the present instance the effect of the proposed substitution, is to set aside a name published by the first describer of the genus, which name is equally applicable to every species hitherto discovered, as it is not contingent on the presence or absence of a sinus or a tabular, or other perforation, but on the existence of a wing attached to the otherwise circular aperture. Hence the supposed necessity for a change of nomenclature is not apparent.

My living specimens of *Pt. rupestris* were taken at Patharghata* during a morning shower in September. I had in vain searched the ground and bushes among the moist rocks and dripping jungle, where multitudes of *Cyclostoma involvulus,* the reversed *Helix interrupta* and *Nanina vitrinoides* were moving about, and had nearly abandoned the search, when I thought of trying an open tract of the hill whence the jungle had recently been cut. Here, on the exposed side of the hill, as well on the bare surface, as under leaves, I at last discovered the sought-for shell. At the foot of the hill a single specimen of a small conoid *Helix,* which I had recently discovered at Berhampore, was found adhering to the leaves of a shrub.

Pterocyclos hispidus, is perfectly distinguished from *P. rupestris* by its greater size, the flatness of its spire, its sculpture, hispid epidermis, retromitted tube, and the inferior development of the adult mouth. Coming from a climate where it enjoys damp throughout the year, it may possibly use the perforation for a breathing hole when its aperture is closed, but in *P. rupestris* the operculum is drawn in beyond the sinus, so that no such use can be made of it for breathing air, for which, moreover, it has probably little occasion during the season of drought and torpidity.

18. *Pterocyclos parvus.* Spiraculum parvum, PEARSON, Journal of the Asiatic Society, vol. ii. p. 592.

This species, which is coloured like one of the varieties of *P. rupestris,* never attains more than half the size of that species. The numerous specimens brought from Silhet have all a perfect, reflected peristome. It is also distinguishable by the greater tendency of the sinus being often in strict contact, though the circle is never completed by the confluence of the shelly matter. The impending wing also shews a greater tendency to a retroverted and tabular form.

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* Besides some other plants in flower which I had not leisure to note, I observed a little blue-flowered *Tradescantia,* a dwarf *Ruellia,* and a beautiful large-flowered *Pesticia* with spikes of flowers of a pale verdigris-green colour, which I had only once before seen ornamenting a corolla in a species of *Ixia (J. maculata?)* In December 1831, the jungle on the side of Patharghata was flaming with the rich blossoms of *Holmskioldia coccinea.* On Kotanási, a hill between Patharghata and Terriagali, I captured a fine specimen of the splendid *Buprestis Chrysis.*

It is probable that SOWERBY's *Cyclostoma bilabiatum,* from Salem in the Madras presidency, will form a fourth species of *Pterocyclos,* distinguished by the sinuated addition at the back of the true lip. When I examined it in London, I thought that it was identical with *P. rupestris,* and that my specimens of the latter had not attained their full growth; a further search in the locality of the species, and the consideration that the sinuated lip must have been of previous formation to the reflected circular aperture, have contributed to alter my opinion on the subject.

Cyclostoma suturale has the aspect of an immature *Pterocyclos.* Its habitat is, I believe, Demarara.

I had prepared the whole of my notes on the collection both of land and fresh-water shells during a period of leisure previously to the close of last year, but I have since then been prevented by want of time from correcting and arranging them. Dr. PEARSON's hint, in his report on the Museum, has called forth this first brochure, consisting of the land-shells, I fear in rather an unfinished state, for which I trust that circumstances will prove an apology. The fresh-water shells shall follow at the earliest practicable period.

V.—*Description of two new species belonging to a new form of the Meruline Group of Birds, with indication of their generic character.*

By B. H. HODGSON, *Esq. Resident in Nèpál*

These birds have the wings, tail, and feet of *Turdus;* and if we continue the comparison from the external to the internal characters, we find a similar construction of the tongue, stomach, and intestines in both.

Both, too, have a similar regimen, habits, and manners. Yet they are strikingly contradistinguished by the respective forms of the bill. In the thrushes that member is compressed, and has its arched maxilla freely exserted from the frontal feathers, and very little cut out by the nasal fossæ. In the birds now in question, on the contrary, the bill is so much depressed as to be more than twice as broad as high at the base; and its straight maxilla, greatly incumbered by the frontal plumes, has the nasal fosse so far produced to the front as to pass the centre of length of the bill.

In the birds before us, too, the head is furnished with a garruline crest; which is never observed in *Turdus.* The tarsi are lower than in the generality of thrushes; and the tail is somewhat longer and less even at the end. Like most of the Nipalese thrushes, these birds are common to all the three regions of the kingdom. They are shy in their manners, adhere exclusively to the woods, live solitarily or in pairs, breed and moult but once a year, nidificate on trees, and feed almost equally on the ground and on trees. I have taken from their stomachs several sorts of stony berries, small univalve mollusca, and sundry kinds of aquatic insects.

These birds are not generally or familiarly known to the Nipalese, but the foresters, whom I have met with, denominate them *Cocho:* and by that name, latinised into *Cochoa,* I have designated them generically in my note book.

As a *Meruline* genus, placed close to *Turdus,* the following character may perhaps serve to mark them.

Wings, tail, and feet, as in *Turdus.*

Tarsi rather lower and tail somewhat longer.

Bill straight, considerably depressed : the maxilla excided beyond the centre by the nasal fosse: the nostrils very large, and nearer to tip than to gape. Head crested as in *Garrulus.* The two species at present known to me I shall call, from their prevalent colour, *Viridis* and *Purpurea.*

The following is their description :—

Cochoa purpurea. Purple Cocho, Mihi. Male, dark purple: cheeks black: crest, tail, and upper apert portion of the wings, soft grey blue, more or less purpurescent: lower part of the wings and tip of tail, black; and both black internally : a white speculum on the wing, just below the false wing : bill and legs black : iris brown. The female, brown where the male is purple ; and the upper part of the wings also brown. The young are rufous below with black bars : brown above with rufescent white drops : head blue as in maturity, but barred. The species is eleven to eleven and a half inches long by sixteen to seventeen wide, and weight three and half to four oz.

Co. Viridis. Green Cochoa, Mihi. Brilliant parrot green, paler and changing into verditer blue on the belly and thighs : crest, cheeks, and neck posteally, brilliant blue : upper part of the wings and tail, the same, but paler with a grey cast; and both black internally, and apertly towards the ends, as in the preceding species; through the eye to the nostrils black : bar of same hue across the pale portion of the wings, caused by the long coverts and bastard wing being tipt with that colour : legs fleshy brown : bill black : iris brown : size of the last: sexes alike.—N. B. This species is apt to vary considerably before it has reached maturity as well as under moult, when the back is sometimes lunated with black; and the soft blue portion of the wings is smeared with brownish yellow. At first, the young males are exactly like the female. The following more particular description of the several members and organs is equally and exactly applicable to both species.

Bill to head as five to four: sometimes merely equal to the head: considerably depressed, except near the tip; at base more than twice as broad as high; straight; culmen produced among the frontal feathers, which are soft and turned back; sides of the maxilla cut out beyond the centre by a broad membranous and plumose fosse: tomiæ locked, trenchant, and entire; towards the gape somewhat incurved—towards the tip, straight: tip of upper mandible inclined and notched; of the lower, subrecurved and subemarginated, sometimes straight and entire. Nares nearer to the tip than to the gape; at fore end of the nasal fossæ, lateral, longitudinal, elliptic, large, free, shaded above by a small nude process of the fossal membrane, and set over with tiny incumbent hairs: gape scarcely to the fore angle of the eye and subciliated: wings reaching to centre of tail, firm, first quill bastard, second long, fourth longest; all four slightly emargined on their inner web. Tail composed of twelve firm feathers, rather longer than in *Turdus*, the four laterals gradated in a small degree, more than in *Turdus*.

Tarsi submedial, stout, rather longer than the central toe, usually smooth, sometimes crossed by three or four scales.

Toes simple, ambulatory, compressed, moderately unequal; outer basally connected; hind stouter and subdepressed.

Nails compressed, obtuse: the central fore with both margins dilated but entire.

Head furnished with a soft, full, garruling crest. Tongue simple, flat, medial, subcartilaginous, with cartilaginous, subjagged, tip. Stomach muscular, of medial subequal thickness, the lining tough and grooved. Intestinal canal 20 to 25 inches long, of subequal calibre throughout; close to anal end, two grain-like cæca.

The intestines are longer in proportion than those of *Turdus*: but otherwise similar.

VI.—*On a New Genus of the Meropidæ.—By the same.*

Order INSESSORES; Tribe FISSIROSTRES; Family *Meropidæ*, *Vigors*.

Order PASSERES, Section SYNDACTYLI, *Cuvier*. Genus new. *Bucia*, Mihi.

Generic character:—

Bill much elongated and arched throughout, strong, greatly compressed; the sides nearly vertical, and the ridge flattened towards the base. Wings moderate, full, not acuminated, fourth quill longest, one and two considerably and subequally gradated. Nares entirely concealed by incumbent setaceous tufts. Tail longish, quadrate, strong. Feet and tongue as in *Merops*. In the family of the *Meropidæ* but one genus has heretofore been recognised. If the above characters be admitted to differ materially from those of *Merops*, and if the birds to which they apply are distinguished by a marked and consequent diversity of manners, I presume the propriety of the generic separation will not be questioned.

Now, the bee-eaters proper, according to my experience, have invariably a long and acuminated wing, and aërial swallow-like habits corresponding to that form of wing. Again, their bill is considerably spread laterally except towards the tip; the general form being tetragonal, and the ridge acute.

In *Bucia*, on the contrary, the wing is not so much acuminated as in the thrushes. It is distinguished for considerable, uniform, breadth; not at all for length; and the habits of the bird are quite foreign to perpetual questing on the wing in the open country: they lead it to seek the deep recesses of the forest,—and there, tranquilly seated on a high tree, to watch the casual advent of its prey, and, having seized it, to return directly to its station. The bill, again, is greatly compressed with vertical sides and ridge flat towards the base, convex towards the tip. This organ is, moreover, strong, longer, and more arched than in *Merops*. The *Buciæ* are of rare occurrence, and are solitary woodlanders; whereas the bee-eaters proper are gregarious, and common tenants of the champaign. Our birds are found in the lower and central regions of Nepal; but seldom or never in the northern. The Nipalese call them *Bukay-chera; chera* being merely a corruption of *chiria*, or bird. I latinise the former word to procure a generic appellation.

I have as yet discovered but one species, of which the following is the specific name and character.

Bucia Nipalensis. Nipalese *Bucia*, Mihi. Bright parrot green, shaded on the belly and vent with bright buff: lining of the wings and lower tail covert, pure buff: wings internally and basally, and tail on the inferior surface, the same: forehead and gular hackles, blue: the last, formed of a double series of long, composed, drooping plumes, ranged opposite to each other on either side the trachea: bill plumbeous, with black tip: iris brown: legs greenish yellow. Length thirteen to fourteen inches: breadth between the wings seventeen to eighteen: weight three to four oz.: sexes alike.

The bill is more than twice as long as the head. It has a considerable and uniform arcuation throughout; is hard, strong, entire, very moderately excavated internally; at base scarcely broader than high;

and nearly twice as high as broad immediately beyond the base. The ridge above, though narrow, is quite flat from the brow to the centre of length; beyond it and below, convex. So great is the lateral compression, that the sides are plane and nearly vertical: the cutting edges are trenchant and unemarginated: the tips pointed and nearly equal. The nares are rounded, lateral, basal; the fossæ evanescent; the aperture covered closely by a small incumbent tuft of setaceous plumuli.

The tongue is long, flattened, pointed, cartilaginous, and feathered towards the tip. The gape is scarcely cleft to the fore angle of the eye, and smooth.

The wings are of very moderate length, but of great and pretty uniform fulness or breadth: the tertiaries and primaries equal: first and second primaries considerably and subequally gradated: third and fourth nearly equal. Fourth longest: first not bastard; more than half as long as the fourth.

The tail is rather long, and is compósed of twelve very firm, broad, and equal feathers. The tarsi are very low: knees and more plumose: acrotarsia scaled: paratarsia smooth: toes long and typically syndactyle; the soles being quite flat, and the exterior toe joined to the central fore as far as the second joint—the interior, as far as the first.

Nails subequal, much compressed, falcate, feeble, and acute: the central fore with a large unpectinated comb. From the chin to the breast depends a row of plumes, inserted opposite to each other on either side the trachea. They are more than two inches long, of composed web, and medial equal breadth. Their mobility gives the living bird a very grotesque appearance. Some such appendage seems to distinguish one of the true bee-eaters, viz. that called *amictus*.

These birds feed principally on bees and their congeners: but they likewise consume great quantities of scarabæi and their like. They are of dull staid manners, and never quit the deepest recesses of the forest.

In the Rája's shooting excursions they are frequently taken alive by the clamorous multitude of sportsmen, some two or more of whom single out a bird and presently make him captive, disconcerted as he is by the noise. It may be worth while to add, in conclusion, that the true bee-eaters are never seen in the mountains: nor the *Buciæ* ever, I believe, in the plains. The intestinal canal in our birds is usually about twelve inches long, with cæca of an inch and more in length, placed near to the bottom of it. The stomach is muscular, and of medial subequal thickness. Such, too, is the character of the stomach and intestines in *Merops*.

VII.—*On a new Piscatory Genus of the Strigine Family.—By the same.*

Order RAPTORES. Family STRIGIDÆ.

Genus new. *Cultrunguis,* Mihi.

Generic character :—

Bill subequal to the head, straightened as far as the cere, gradually curved beyond it, moderately compressed, strong. Wings medial, equal to the tail, four and five longest and subequal; three first considerably gradated, first not pectinated. Tarsi rather elevate, partially or wholly nude, reticulate. Toes nude, and reticulate with three or four scales next the talons; the anteriors subequal. Talons medial, stout, subequal, compressed, cultrated below*. Egrets as in *Bubo,* disc and ears as in *Noctua.* Tail short.

It is some time since Gen. HARDWICKE made known to science an owl with nude tarsi†. The circumstance was remarkable, but it does not seem to have led him to any further investigation. Some years back I discovered a similarly-characterised species, and at the same time noted that the talons were sharpened like a knife on their lower edge. In process of time I discovered another species with the tarsi half naked; and this also had cultrated talons. But my specimens of both species happened to have the stomach empty; and I had no immediate means of observing the manners of the birds. In 1830 I had opportunity to note that both species flew well by day, and were constantly found on the banks of rivers. Analogy with the eagles then led me to suspect that these birds might possibly be fishers: but still, until I had seen them fishing, or had obtained specimens with fish in the stomach, I could have no safe ground for assuming so extraordinary a fact. I have now, however, procured specimens with the stomach full of fish, and fish only‡; and I presume that the *expost-facto* inference from structure to habits will scarcely be questioned. Whether HARDWICKE's owl will, when better known, constitute another genus of the fishing owls, remains to be proved: but that bird is sufficiently distinguished from either of mine by its shielded tarsi. In forming a new genus for two new species, essentially alike, and very materially differing both in conformation and habits from all known birds of this family, I rely upon the sanction and support of men of science. And I shall only add, before proceeding to give the specific characters, that those of the genus have been derived from a freer use of ordinary external characters than has heretofore been made in respect to the Strigine birds. Cuvier regarded these birds as constituting but one genus. Vigors raised this genus to the rank of a family, advancing Cuvier's subgenera to genera. But Vigors left Cuvier's character as he found them,—whether wisely or not, I shall not presume to say. I suspect, however, that, as species multiply and become accurately known, resort will be had to characters analogous to those by which the Diurnal Raptores (to go no further) are generically distinguished, if not from a sense of the superficialness of the old characters, yet from a want of determinate new ones. It is surely reasonable to distinguish all the *Raptores* upon similar principles; and, as the external construction of the Strigine birds certainly renders this quite practicable, so, I believe, that the analogies thus necessarily suggested to the student between them and the Falconidæ, would tend to the higher uses of the science.

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* Hence the generic name, *cultratus* and *unguis*.

† Of the yet earlier *Strix nudipes* of Daudin, nothing seems accurately known.

‡ I have just discovered that they prey on crabs as well as common fish. B. H. H., 2nd July, 1836.

First species: *C. Flavipes*, yellow-footed Cultrunguis, Mihi. Head, neck and body below, bright rusty,* each plume striped down the shaft with saturate brown; the stripes narrower below than above: disc and leg-plumes immaculate: back wings and tail, saturate brown, transversely barred, and largely emarginated and tipt, with rusty; the bars interrupted on the shafts, and frequently resembling triangular indentations: four bars across the great quills and tail feathers; and the tips of both largely paled: plumes of the thighs and tarsi downy: half the latter nude: nude portion and the toes, flavescent fleshy grey: talons horn yellow: bill blue, with a dusky tip: iris bright yellow: edges of eye-lids black: twenty-two to twenty-three inches long by 55 to 58 wide. Weight three and a half lbs.

N. B. The sexes resemble each other both in size and colours.

Second species: *Cultrunguis Nigripes*, Mihi. Head, neck, back, and whole body below, pale earthy brown, with a fawn tinge; paler and albescent on the abdominal surface; each plume striped down the shaft with a saturate brown mark, which is narrower below than above; and each also crossed with numerous slender zigzags of brownish fawn colour: wings and tail saturate brown, triangularly indented or cross-barred, and broadly tipt, with obscure rufous yellow, which is freckled, for the most part, on the tertiaries, and scapulars, with brown: great quills and rectrices, quadricinctate, as in the preceding: disc earthy brown: thighs pale fawn: both immaculate: throat white, and almost or wholly unmarked: wings albescent towards the roots of the feathers: bill dusky horn: iris bright yellow: edge of eye-lid black: tarsi and toes, purpurescent dusky: talons the same, with black points: thighs and knees to the front, covered with downy plumes: tarsi and toes, nude: size of the last.

N. B. This species bears an extreme resemblance, in point of colours and size, as in other respects, to the *Strix Hardwickii.* But it may be at once distinguished therefrom by its reticulated tarsi.

The sexes, as in the preceding species, are alike both *in size* and colours. These birds moult once a year, between June and October, inclusive; they breed in February-March; and are almost equally common in the several regions of Nepál, notwithstanding the great diversity of climate.

The structure of their stomach and intestines offers no marked peculiarity. The intestinal canal is from three and half to four feet long; very thick-coated throughout; considerably wider above than below; and furnished with two thin cæca, from three to four inches long, which are situated near the anal extremity of the canal, and widened considerably at their distad end.

The stomach is rounded, considerably and equally thickened in its coats, and provided with a toughish and rugose lining, which is easily separated.

The coats do not consist of proper muscle, but of a substance between gland and cartilage; for which I know no name, commonly as it occurs. The succentorial stomach is purely glandular, with soft papillated lining, not distinguishable from the body of the organ; the points of the papillæ being, in fact, mere excretory pores directly in contact with the secreting substance.

The following detail of dimensions is taken from a male specimen of *Flavipes:* but so similar are the two species, and the sexes of both, that it will equally represent the average size and proportions of the males and females of both species.

	ft.	*in.*	
Tip bill to tip tail, ...	1	10	
Bill, length of,..	0	2	
—— basal height of, ...	0	1	$\frac{3}{8}$
—— basal breadth of, ...	0	1	$\frac{4}{8}$
Tail, ...	0	9	
Tarsus, ...	0	3	$\frac{1}{2}$
Central toe, ...	0	2	$\frac{1}{4}$
Expanse of wings, ...	4	10	
Weight, ...	3½lbs.		

VIII.—*Report of the Society of Arts on Specimens of Rice, Wool, &c. from Nepál and Assam.*

[Communicated by Government.]

The Society having received from their Committee of Colonies and Trade a report on sundry articles sent to them for examination from the Honorable Court of Directors of the East India Company, have been pleased to approve the same, and have directed their Secretary to transmit a copy of the Report forthwith to the Honorable the Court of Directors, with an assurance that the Society will at all times be happy to receive from them any communications connected with the objects of this Society.

(Signed) ARTHUR AIKIN, *Secy.*

REPORT.

The Committee of Colonies and Trade having been directed by the Society to examine sundry articles sent to the Society by the Honorable the Court of Directors of the East India Company, and referred to this Committee 4th November, 1835, report as follows :

I. The Soomla or Himalaya paddy, or mountain rice, received from Mr. HODGSON, Resident at Nepal, appears to be of the same kind as a sample (comprising five varieties) sent to the Society of Arts in 1821, by Dr. WALLICH.

From the great height above the level of the sea at which this grain is cultivated in Nepal, it is suggested that it may perhaps be advantageously introduced as an agricultural crop in the North of Europe.

Before this can be determined in the affirmative, it is necessary to prove, first, that this grain is capable of coming to maturity in the climate of the North of Europe ; and, secondly, that the clear profit of a crop of hill-rice from a given area shall be at least equal to that of a crop of oats, barley, or rye from the same area.

Several parcels of the former quantity of hill-rice were distributed by the Society to persons residing in various parts of England ; and several were likewise sent to France, to Switzerland, to Germany, and to Russia. Of those sent to the Continent, the Society has received no intelligence ; and of those distributed in England, the result has been, with one exception, that the seeds did not germinate. A notice likewise was inserted in one of the French journals a few years ago, from which it appeared that various attempts had been made to grow the hill-rice of Nepál in some of the districts of France from seed distributed by the Government of that country, but wholly without success.

Mr. ANDERSON, the Curator of the Apothecaries' garden at Chelsea, was one of those who undertook to make an experiment on the possibility of growing the hill-rice in England, and was, in consequence, furnished with some seeds of the five varieties at that time in the Society's possession. They were sown in March, and some of each kind germinated and did very well while they were kept in the hot-house. In May they were removed to the green-house, where they became stout, healthy plants. In the end of June they were transferred to a sheltered place in a basin for the growth of aquatic plants, having nine inches depth of water and twelve of mud; here they grew and promised well till the beginning of August, when, the weather becoming cloudy and rather cold, they became sickly, and were all dead by the beginning of September without having come into flower. It seems, therefore, evident that the temperature even of the warmer parts of England is not sufficient for the successful cultivation of hill-rice.

The latitude of Sirinagar, where this grain is cultivated, is about 30° ; that is, under nearly the same parallel as Cairo; and although, from its height above the sea and its vicinity to ridges of snowy mountains, the winters are severe, yet in such situations the summers are much hotter than on lower levels in higher latitudes, where the average temperature of the whole year is not perhaps greater than that of the middle of one of Europe. In Florence, and even in Rome, frost and snow are by no means of unfrequent occurrence in the winter, and yet the summers are hot enough to bring to perfection many annual vegetable products, rice among the rest, which will not succeed north of the Alps.

Concerning the second head of inquiry,—viz. the comparative profit of land cropped with hill-rice, and with barley or oats,—the Committee are not in possession of a single fact on which to found an opinion. But they may be allowed to state that, as the farinaceous food of Europeans is consumed chiefly in the form of bread or of cakes, and as rice is not capable of being made into either one or the other of these preparations by the simple process of kneading with cold water and then baking, either an additional process of cooking would be necessary in the attempt to substitute rice for the ordinary European grains, or the new habit must be superinduced, of doing without bread and replacing it by boiled rice.

In order to obtain a correct opinion of the comparative value of hill-rice with the other qualities of this grain in the London market, a sample was sent to Mr. Ewbank for examination. That gentleman reports that fine Carolina rice, imported in the state of paddy and cleaned here, is worth 30 shillings per cwt.; that fine Bengal rice cleaned here, is worth 23 shillings per cwt.; that rough and inferior East India rice, imported half-cleaned and finished here, is worth 14 shillings per cwt. This latter was purchased from the importer at eight shillings, lost 20 per cent. in cleaning, and the cost of this process was two shillings per cwt.; so that there remained only two shillings per cwt. for interest, profit, &c.

The hill-rice is nearly of the same quality as the latter kind, being dark coloured, opaque, and not at all calculated for the English market.

The opinion, therefore, of the Committee is, that the hill-rice cannot be successfully cultivated in Europe; and that, if capable of being so cultivated, it could not enter into competition in the European market with Bengal rice.

II. The wool of the Hooniah sheep of Tibet consists of two samples,—one, of the wool in its natural state; and the other, of a portion from which the black hairs have been separated.

The former is of precisely the same quality as a parcel sent last year (1834) to the Society by Dr. WALLICH; and the market price of it in London, at that time, was, according to Mr. EBSWORTH, of Basinghall Street, from 10 to 11 pence per lb.

The two samples, after being examined by the Committee, were also examined by Mr. EBSWORTH, and by Mr. SOUTHEY, of Coleman Street.

According to Mr. EBSWORTH, the value of the wool in its unsorted state is from five to seven pence per lb. A considerable quantity of similar wool from India, but rather coarser, has been sold in the London market during the last two years at from two and half to seven pence per lb. The sorted wool is worse than the unsorted; for, in separating the dirt, all the finer filaments have likewise been taken away.

Mr. SOUTHEY estimates the value of the unsorted wool at about 10 pence per lb.; and states, that it greatly resembles a large portion of the wool imported from Jutland and Denmark.

Mr. HODGSON's expression that the "wool is said to be superb," does not in the least apply to the sample actually sent by him; but as he has stated that the animal "is of trans-Himalayan origin, and will not bear the heats of Nepál*," it seems probable that the wool in question was grown in that country, and has greatly degenerated; it being well known that the sheep of Barbary produce hair rather than wool.

The Committee think it incumbent on them to notice an opinion expressed by Mr. SOUTHEY, from the great attention which that gentleman has paid to the growth of wool; namely, that the Hooniah and other coarse qualities of Indian wool, of which many hundred bales have recently been imported, would be very materially improved by the introduction of some well-selected rams, of which an ample supply might no doubt be obtained from New South Wales.

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* This expression completely confirms the observations previously made respecting the hill-rice of Nepál, which thus seems to grow in a climate too hot for the production of wool.

III. Two large pieces of cloth made from the down of the Simool or Tree-Cotton, *Bombax heptaphyllum*, from Gowahatty in Assam, the place of their manufacture.

On examining the cloth it appears that the fine short down of the *Bombax* has been spun into a large wove slightly twisted cord or roving, and that this is made into cloth by interweaving it with a warp and short of common thin cotton-thread, much in the manner of carpeting. It composes a loose cloth, incapable, probably, of being washed without injury, but considerably warm, very elastic, and light.

From the shortness of the staple and the great elasticity of the fibre, it is not at all probable that it could be spun by the machinery now in use for spinning cotton ; but the combination which it exhibits, of fineness of fibre with great elasticity will, no doubt, make it rank high as a non-conductor of heat, and therefore fit it for making wadding, and for stuffing muffs, and perhaps mattresses. When carded with wool it might probably form the basis of fabrics of great warmth, lightness and silky softness.

IV. Sample of Safflower made at Myrung in Assam, by Lieut. RUTHERFORD.

The Committee not wishing to rely entirely on their own judgment in this case, more especially as the whole quantity placed at the disposal of the Society is not enough for a satisfactory comparative trial either on silk or on cotton, have availed themselves of the opinion of several dyers and brokers, the concurrence of whose judgment with that of the Committee induces them to consider it as correct.

Mr. GRIEVE, silk dyer, of Booth Street, considers the sample to be clear and of good quality.

Messrs. RACINE and JAQUES, silk dyers, of Spitalfields, consider the sample to possess a fair proportion of colour, though not of equal quality with the best from Bengal.

Messrs. JOHNSON and RENNEY exhibited to the Committe samples of safflower from different places and of various qualities. They stated that the best Indian comes from Dacca, of which there are two varieties, one from Paturaghauta, and the other from Billespour ; the former of which is the more valuable to the amount of about 20 per cent.

Mr. RENNEY stated, that during his residence in India he paid much attention to the preparation of this dying drug. The time for gathering the flowers is near the end of the dry season, when the tanks are almost exhausted; in consequence of which, the water employed to wash the safflower is generally muddy and swarming with animalculæ: hence it happens that the cakes, though packed in close boxes, are often more or less injured by worms; which injury he conceives would be greatly diminished by substituting clean spring water for that of the tanks. The sample before the Committee is fair and clean, and suitable for the market, and is worth about £ 7 a cwt.

The finest safflower of all comes from China, but is not an article of regular appearance in the market. The comparative value of it is as high as £ 30 per cwt.

Mr. Emley, drug-broker, and a Member of the Committee, considers the sample to be of good fair merchantable quality, and in value as stated by Messrs. Johnson and Renney.

V. Two skeins of fibre made from the leaves of the wild pine-apple, and two net bags made of the same material, sent from Gowahatty in Assam, by Captain Jenkins.

The sample is not sufficient for any fair comparative trial of its tenacity.

The Society are already in possession of fibre from the leaves of the black Antigua pine and from the Penguin pine of Jamaica, which latter is occasionally made into ropes in the West Indies, but is not the object of any regular manufacture, the expense of labour in those colonies rendering it more advantageous to import from England cordage ready made. It appears likewise (from Burnett's Wanderings in New South Wales, &c. vol. ii. p. 207), that at Singapore the Chinese settlers obtain fibre from the leaves of the wild pine-apple, which fibres are exported to China, where they are employed as a material for linen. Also in the Journal of the Asiatic Society of Bengal, for January, 1832, is a paper by Lieut.-Col. Watson on Chirra Punji, the sanatory station recently occupied by the East India Company, in which it is stated, p. 27, that the pine-apple plant flourishes in great abundance in the adjacent valleys, 4,200 feet above the level of the sea, and that the leaves are gathered by the natives for the purpose of obtaining from them, by a very simple process, a strong fibre, which they employ as the material of the net pouches or bags in common use among them.

From these indications it would perhaps be worth while for the Court of Directors to have a quantity of the fibre imported, sufficient for a fair comparative trial with hemp and flax.

IV. Sample of the wood of the Nipal Privet, Ligustrum Nipalense, from Mr. Hodgson.

A specimen of this wood was found among those sent to England by Dr. Wallich, and of which a catalogue is published in the 48th vol of the Society's Transactions. It appearing to Mr. Aikin, the

Secretary, when drawing up the catalogue*, that the specimen referred to promised to be useful to engravers on wood, it was accordingly put into the hands of Mr. Branston, who reported very favorably respecting it. That specimen was a piece of a bough or trunk a few inches in diameter, and had been taken sufficiently high above the root to be of a perfectly uniform texture. The present sample, from its broad irregular rings, appears to have been cut as near as possible to the root, in order to get it of the greatest size: but, in so doing, the uniformity of texture absolutely necessary to fit it for use by the engraver has been wholly overlooked, and the result is a sample perfectly worthless for the object for which it is intended.

By order:

(Signed) Arthur Aikin, *Secy.*

IX.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 6th July, 1836.

The Rev. Dr. Mill, Vice-President, in the chair.

Captain R. Lloyd, I. N., Dr. D. Stewart, and Dr. McClelland, proposed at the last meeting, were ballotted for, and elected members of the Society.

Mr. Wm. Speir was proposed by Mr. J. Prinsep, seconded by Dr. Mill.

Sergeant Dawe, of the Delhi Canal Establishment, proposed as an associate member by Mr. J. Prinsep, seconded by Dr. Pearson.

Read a letter from Wm. Mackenzie, Esq., stating that, in consequence of the pressure of business, and other indispensable engagements, he was obliged to retire from the Society.

Read a letter from Charles Konig, Foreign Secretary to the Royal Society, acknowledging the receipt of the Journal, and Index As. Res.

The following circular, enclosed in the above, was read and directed to be printed for general information:—

Royal Society of London, Somerset House, Nov. 19, 1835.

Sir,

I am directed by His Royal Highness the President and Council, to acquaint you, for the information of the Asiatic Society of Bengal, that His Majesty the King has been pleased to grant two Gold Medals, of the value of Fifty Guineas each, to be awarded by the Royal Society on the day of their Anniversary Meeting in each succeeding year, for the most important discoveries in any one principal branch of Physical and Mathematical knowledge.

His Majesty having graciously expressed a wish that scientific men of all nations should be invited to afford the aid of their talents and researches, I am accordingly directed by the Council to announce to you, Sir, that the Royal Medals for 1838 will be awarded in that year, the one to the author of the most important unpublished paper in Chemistry which may have been communicated to the Royal Society for insertion in their Transactions, after the present date and prior to the month of June in the year 1838;—the other, to the author of the most important unpublished paper in Physics, which may have been communicated to the Royal Society for insertion in their Transactions, after the present date and prior to the month of June in the year 1838.

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* See Journal As. Soc. II. 182.

I have the honour to be,
Sir,
Your very obedient humble servant,
Chas. Konig, *For. Sec. R. S.*

To James Prinsep, Esq.
Secretary of the Asiatic Society of Bengal, Calcutta.

Read a letter from H. T. Prinsep, Esq. Secretary to the Government of India, General Department, intimating that the Right Honorable the Governor of Bengal had been pleased to empower the Curators of the Public Library to make over to the Society the Oriental books printed in Europe, on the same conditions, with the manuscripts and works already transferred from the College of Fort William. The Secretary stated that he had in consequence received charge of three hundred volumes—some few being, however, duplicates of works already in the library.

A letter from the Civil Auditor, desiring to be furnished with an abstract of the establishment entertained for the care of the Government Oriental Works. Understanding the 78 rupees monthly to be a consolidated allowance, in which case no detail of its expenditure need be furnished, Resolved to make a reference on the subject to Government.

Library.

Read a letter from H. T. Prinsep, Esq. Secretary to the Government of India, forwarding on behalf of the Honorable the Court of Directors for presentation to the Society, a copy of the Catalogue of Stars in the Southern Hemisphere, by Lieut. Johnson, H. C. Ast. at St. Helena.

Read a Persian note from Manu Lal, presenting a copy of a compilation from standard Persian and Hindustani Poets, published by himself under the name of *Guldesteh i Nishát,*—The Nosegay of Pleasure.

Read a letter from Kumar Radhacanth Deb Behadur, forwarding for presentation to the Society a copy of his great publication, entitled *Sabda Calpa Drama,* an Encyclopedical Lexicon in Sanscrit, vols. 1, 2, and 3. The subsequent or the remaining vols. will be forwarded when published. Also translation of an extract from a Horticultural work in Persian, printed by the Roy. As. Soc. of London.

A volume of selected papers of a literary nature published in the Government Gazette while Mr. Wilson was Editor, was presented by *Mr. James Prinsep.*

Meteorological Registers for April and May 1836, were presented by the *Surveyor General.*

Museum.

Read a letter from Prof. Goodeve, Secretary to the Medical and Physical Society, requesting the Society's acceptance of a pair of glazed almirahs, their contents having been transferred to the Medical College.

Two large chatta-hats from Assám, were presented by *Dr. W. B. Davis.*

Various rude specimens of domestic implements from New Zealand, by *Mr. H. T. Prinsep.*

Literary and Antiquities.

Read a letter from R. D. MANGLES, Esq. Secretary to the Government of Bengal, Judicial Department, transmitting on behalf of the Right Honourable the Governor of Bengal, a Census of the population of the town of Gyah and its suburbs, framed under the superintendence of Mr. HATHORN, the Magistrate of *Behar.*

A note on the origin of the Armenian era and the reformation of the Haican Kalendar, by *Mr. Johannes Avdall.*

Read a letter from L. WILKINSON, Esq. Agent at *Bhopal,* forwarding the copy of an inscription on a copper-plate lately found at Piplianagar in the Shujal Perganah, by a krisan, or husbandman, in ploughing; with an English translation.

Read a paper by Major LLOYD, on the sacred silken vests of the Tibetan priests, alluded to in TURNER's Embassy. They are adorned with images, and have a lettered border of sacred texts woven into the scarf: one of these had been submitted to Mr. CSOMA DE KÖRÖS, and by him translated.

[This note will be printed in our next.]

Mr. HODGSON forwarded an amended list of the Sanscrit Bauddha works procurable in Nepál. Such as have been sent Home to Paris or London, were noted by an asterisk.

Physical.

A note on the progress of the boring in Fort William was read by Capt. TAYLOR, Town Major. [Vide infra.]

A memorandum of a well sank in the Chandpur bunds, near the foot of the Sewalík range, was likewise communicated by Lieutenant BAKER, Engineers.

A descriptive catalogue of part of the Society's collection of Silhet shells, was received from Mr. W. H. BENSON, M. A. S.

[Printed in the present number.]

A letter from Lieutenant GEO. FULLJAMES, giving further detail of the fossil discoveries at Perim, and announcing the despatch of specimens for the Society's museum.

[As this letter arrived while the Baron HUGEL's note was in the press, the interesting particulars it contained were appended to that paper; see last No. p. 290.]

Mr. B. H. HODGSON transmitted 27 further specimens of his Illustrations of Nipálese Zoology; also papers,

On three new genera of thrush.

On three new species of woodpecker.

Dr. W. CANTOR submitted his sketch of an undescribed hooded serpent with fangs and maxillar teeth, accompanied with coloured drawings on a large scale.

Dr. N. WALLICH presented two papers on new genera of plants, by Dr. GRIFFITHS, to which the author has given the names of Bucklandia and Sedgwickia.

[These will be inserted in our next.]

Presentations to the Museum of Natural History.

Specimens of the great-eared owl, *(Bubo Macrocephala ;)* Flammeous Fly-catcher, *(Muscicapa Flammea ;)* Gurial King-fisher, *(Halcyon Gurial;)* black-headed Oriole, *(Oriolus Melanocephalus ;)* Bengal woodpecker, *(Picus Bengalensis;)*—Woodpecker, *(Picus Macei ;)* skulls of Hornbill, *(Buceros Homrai ;)* and Pelican, *(Pelecanus Onocrotalus,)* and skin of the Amethystine Python ; presented by *W. B. Davis, Esq.*

Specimens of Silky-throat Ráyá, *(Raya Sericeo-gula ;)* Nepal Bucia, *(Bucia Nepalensis;)* black-headed Sibia, *(Sibia Nigriceps ;)* Picaoid Sibia, *(Sibia Picaoides;)* and blue-winged Chloropsis, *(Chloropsis Cyanopterus ;)* presented by *B. H. Hodgson, Esq.*

The above are specimens of new genera, instituted by Mr. HODGSON ; papers on which he has favored the Society with ; and the specimens will be figured in his great work on the Fauna of Nepal.

Specimens of white eye-browed Jacana, *(Parra Superciliosa,)* and Girra Teal, *(Anas Girra,)* presented by *W. C. Smith, Esq.*

The internal ear of the Whale, presented by *H. T. Prinsep, Esq.*

Specimens were exhibited of Birds from Almorah, mounted in the Museum ; and an articulated skeleton of the Adjutant, also prepared there.

On the conclusion of the ordinary business of the meeting,

A letter was read from the Most Rev. the Bishop of Cochin China, (who was present at the meeting) resubmitting a proposition for the publication of his Anamitan Dictionary, and stating that in an interview with the Governor General, he had been empowered by his Lordship to renew his application to Govt. through the Secretary of the Society.

The favorable recommendation embodied in the report of the Committee of Papers last year was qualified on one poi[illegible]; [illegible] much as the spec[illegible] work then before them wanted the Chinese character, which [illegible] deemed essential to its perfection as a literary work. This was now removed, and the Bishop was present, and ready to engage for its correct insertion : he would also engage, should it be determined to publish in lithography, to write, or superintend and correct, the whole of the work on transfer paper, for the consideration of 4,000 rupees. The paper and printing might cost about 1,200 more. On these new grounds it was agreed that there would be no disrespect in submitting a second application to Government in favor of the proposition, which the Secretary was requested to prepare.

Note on the Progress of the Boring in Fort William. By Captain TAYLOR, M. A. S.

In laying before the Society the accompanying section* and specimens of the strata found in the recent operations carried on in Fort William for the discovery of a spring of pure water, it may be expected that I should give some account of the progress and state of the experiments; I therefore beg to offer the following observations.

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* We postpone this until the operations, hitherto so successful, may have been brought to a close.—ED.

A detail of the early part of these operations, which commenced in October last, would comprise little besides a narrative of difficulties barren of facts scientifically interesting. It will be sufficient briefly to state, that in the first attempt a depth of 136 feet only was attained by boring; when the same quicksand which in every case seems to have baffled General Garstin's efforts to proceed, put an end to this also.—The tubes, without support in the loose sand, separated in several places, and fell out of the perpendicular; all attempts to rejoin or recover them failed.

As the same strata, and consequently in so much as that is concerned, the same difficulties might be expected to occur in boring in any part of the alluvial formation of the delta of the Ganges, it was not supposed that any material advantage would be gained by changing the site of operations; it was resolved to proceed with a second attempt in the immediate vicinity of that where we had just failed.

On the 28th of April another shaft was commenced; experience had suggested several improvements in the arrangement of the machinery, and taught us to use the tools with better effect. The improved skill of the workmen was made manifest by the fact, that the depth of 126 feet, which in the first attempt occupied forty-seven working days to attain, was now reached in eighteen with ease and facility.

So far the strata passed through, corresponded precisely, in their order at least, with all that had occurred on former occasions. The same quicksand which caused the abandonment of the first attempt was reached at 120 feet; and at this point our difficulties commenced. To obviate the disaster which had rendered our labour abortive in the first instance, the tubes were secured against dislocation in the loose sand by screws at their joints; and to this precaution must be attributed the success of the work so far. The sand alluded to is of so loose, I may say, semifluid a character, that on the removal of a portion of the water which stands in the tube to 15 feet from the surface, it immediately rose 17 feet; and although at this time the work was prosecuted night and day without any intermission, the sand rose faster in the tubes than it could be removed; so that at the end of eleven days and nights of incessant toil it had risen from 124 to 103 feet.

Hence it became evident that the only mode of overcoming the obstacles presented by the sand was to force the tubing down, until coming in contact with some firm stratum, the sand should be excluded. By unrelaxing perseverance and much labour, frequently gaining but a few inches in the day, the tubes at last attained a depth of 157 feet. The sand was gained upon; at 152 feet it was observed to become darker in color and coarser in grain, containing a quantity of what appeared to be small pieces of iron ore*. At 159 feet a stiff clay with yellow veins occurred, resembling in appearance a thin stratum passed at 127 feet. The borer, which during the prevalence of the sand was always behind the tubing, sometimes several feet, now penetrated in advance of it, and in less than 24 hours reached the depth of 175 feet.

The clay at 163 feet changed, for a short space, remarkably in color and substance; becoming dark, friable, and apparently containing much vegetable and possibly some ferruginous matter. At 170 feet it became sandy, and gradually passed into a very coarse sharp sand mixed with small fragments of quartz and felspar, which was brought up from 175 feet.

This gravel or shingle at present impedes further progress, until we shall have made some auger capable of penetrating and lifting the stones.

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* Red waterworm nodules of hydrated oxide, like the laterite of South India.—Ed.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of June, 1836.

Day of the Month.	Observations at 10 A. M.									Observations at 4 P. M.									Register Thermometer Extremes.			Wind.			Weather.		
	New Stand. Barometer red. to 32°.	Old Stand. Barometer at 32°.	Wet Barometer at 32°.	Difference.	Thermometer in air.	Wet-bulb Thermom.	Leslie's Dif. Hygrom.	Dew point at 9 A. M.	Hair Hygrometer.	New Stand. Barometer red. to 32°.	Old Stand. Bar. at 32°.	Wet Barometer at 32°.	Difference.	Thermometer in air.	Wet-bulb Thermom.	Leslie's Dif. Hygrom.	Dew point at 2 P. M.	Hair Hygrometer.	Cold on roof.	Heat in sun on roof.	Rain.	Morning.	10 A. M.	4 P. M.	Morning.	10 A. M.	4 P. M.
1	29,497	,543	28,974	—,569	88,4	5,9	4,8	75,4	93	29,379	,423	28,802	—,621	92,6	9,6	7,9	74,8	86	70,0	96,2	0,20	S.	sw.	sw.	cum.	overcast.	fine rn. at nt.
2	,524	,505	,989	,516	88,5	7,5	6,0	75,4	88	,397	,439	,806	,633	93,1	10,9	8,7			68,0	98,9	,45	SE.	se.	sw.	do	cumuli.	misty. do
3	,589	,630	29,064	,566	87,0	6,4	5,3	75,6	93	,479	,531	,872	,659	93,8	13,2	11,5	73,6	79	68,8	100,8		se.	ssw.	s.	do	cum. str.	fine do
4	,601	,648	,062	,586	88,5	7,1	5,6	75,0	92	,475	,528	,844	,685	94,5	12,3	10,0	75,6	82	72,1	102,0		se.	se.	s.	clear.	do	misty.
5	,563	,590	,008	,582	89,4	8,8	7,0	75,0	88	,443	,495	,838	,657	91,7	9,4	7,6	76,4	86	77,4	98,9		S.	se.	se.	cum.	cumuli.	hazy.
6																			81,2	98,0		sse.			cirri.	do	
7	,477	,520	28,904	,616	90,7	6,9	5,6		91	,372	,428	,768	,660	94,2	9,6	10,0		82	81,8	100,0		S.	sw.	sw.	cum. strat.	cu. stra.	fresh breeze.
8	,497	,537	,932	,605	90,1	6,5	5,4		92	,406	,453	,796	,657	92,9	8,5	6,5		89	82,1	91,0		S.	sw.	sw.	cum.	cum.	do
9	,487	,528	,906	,622	90,8	6,4	4,9		91	,385	,433	,784	,649	93,4	7,1	5,5		84	81,0	92,0		S.	sw.	se.	c. cum.	blowing fresh	fine.
10	,515	,552	,936	,626	90,5	8,7	7,4	78,4	86	,428	,468	,818	,650	94,8	9,2	6,2		87	82,0	98,7		SSW.	SW.	sw.	strong wind.	cumuli.	do
11	,504	,625	29,019	,606	90,3	7,1	7,0	77,7	89	,469	,514	,866	,648	90,3	8,9	6,7	76,0	87	82,0	—		S.	SW.	S.	do cl.	cum. cirri.	storm. nwr.
12	,636	,666	,108	,558	87,9	7,4	6,6	74,6	89	,562	,542	29,324	—,218	95,1	11,3	dry	76,0	83	72,2	—	1,70	o.	S.	S.	cum. str.	storm.	fine rn.
13	,567	,596	,405	—,191	86,5	3,1	4,5		93	,452	,492	,299	,193	88,4	7,8	6,2	70,8	88	72,0	99,6		S.	S.	W.	heavy rain.	cum. cirri.	nimby.
14	,526	,568	,372	,196	86,0	6,0	5,5		91	,426	,472	,238	,234	92,6	10,3	9,7	70,7	81	81,0	102,4	,35	s.	w.	sw.	cir. cum.	overcast.	cum. str.
15	,550	,590	,383	,207	86,6	4,0	3,8		95	,461	,507	,290	,217	87,9	6,3	6,0	75,5	89	78,0	105,3		e.	sw.	NE.	do	cumuli.	hazy.
16	,583	,623	,411	,202	88,9	6,5	6,2		88	,483	,525	,314	,211	87,8	4,6	5,0	75,7	92	78,2	110,0		s.	e.	se.	do	cum. str.	threaty.
17	,605	,628	,441	,187	87,6	3,4	4,0	78,0		,484	,516	,330	,186	83,4	3,2	4,0	77,0		78,8	87,2		sw.	sw.	se.	cu. strat.	do	cloudy.
18	,583	,594	,460	,134	86,8	2,3	2,5	76,0		,454	,485	,304	,181	86,1	4,5	5,9	76,3		76,8	88,0		se.	sw.	se.	cir. cum.	do	do
19	,558	,576	,390	,186	87,3	3,9	6,1			,482	,514	,330	,184	86,7	3,4	4,4	76,6		74,8	106,4		S.	s.	sw.	do	fine.	threaty.
20	,603	,634	,450	,184	86,9	2,3	5,1	76,7		,486	,524	,320	,204	87,6	6,6	5,4	76,5		77,7	107,2	,30	sw.	S.	sw.	cum.	cum. strat.	do
21	,587	,611	,430	,181	87,8	3,3	6,1			,467	,500	,294	,206	88,7	8,1	6,0	77,0		75,8	109,1		w.	SW.	se.	do	cumuli.	cloudy.
22	,528	,561	,368	,193	87,1	5,5	4,4	76,3		,381	,428	,224	,204	89,7	dry	8,0	78,5		76,8	118,7		o.	wsw.	se.	do	cum. strat.	do
23	,497	,534	,324	,210	88,8	8,8	8,0	74,8		,360	,400	,190	,210	91,3	7,3	7,0	77,5		77,8	110,5		o.	W.	ne.	do	cumuli.	cir. cum.
24	,477	,523	,294	,229	88,7	7,2	7,2			,341	,395	,146	,249	93,9	10,9	10,0			76,8	102,0		n.	se.	ne.	cirri.	do	threaty.
25	,411	,456	,220	,236	90,5	7,8	6,3		89	,321	,355	,140	,215	89,2	4,6	4,4	78,5	94	77,5	100,3	,10	E.	ne.	ne.	do	cum. strat.	showery.
26	,352	,378	,192	,186	84,9	4,3	3,8		94	,228	,267	,060	,207	85,5	5,7	4,2	77,0	94	76,2	90,0	,20	ne	ne.	NE.	nimbi.	cirrus	do
27	,286	,302	,118	,184	83,9	3,2	2,3	77,4	96	,255	,295	,108	,187	81,2	5,1	3,3	77,3	94	75,0	92,4	1,15	E.	NE.	ene.	rain. gale.	showery.	do
28	,495	,527	,358	,169	84,6	3,8	2,8		97	,428	,459	,279	,180	84,8	3,4	2,6			74,8	96,0	,15	e.	SE.	se.	clear.	do	do
29	,522	,554	,370	,184	86,5	4,7	3,6			,418	,454	,232	,222	92,0	8,7	7,0			76,5	104,5	,05	sw.	sw.	sw.	do	overcast.	cumuli.
30	,480	,511	,312	,199	86,7	6,0	4,7			,444	,479	,286	,183	86,2	4,5	3,4	77,0		77,4	104,0		sw.	sw.	se.	cir. str.	hazy.	rain.
ean,	29,525	,557			87,6	5,7	5,9	76,1	91	,418	,460			90,0	7,4	6,3	75,9	86	76,6	106,3	4,65	two fresh breezes.			rain rather backward.		

The new standard Barometer stands this month ,032 at 10 A. M. and ,042 at 4 P. M. lower than my former standard, giving the same difference between the morning and evening eadings as remarked during the two preceding months.

The sulphuric acid in the " wet Barometer" had a specific gravity of 1,344 up to the afternoon of the 12th. when it was changed for a stronger acid of 1,480 sp. gr. at 90°. The tensions re taken by deducting its readings from those of the old stand. Bar. as should have been done last month, where a correction of + .023 must be applied to the columns of tensions: (the sign ould also have been +.) the centesimal aqueous tension of Sulphuric acid sp. gr. 1,344 (compared with that of pure acid) is therefore 44; and of sulphuric acid sp. gr. 1,48, is 19.

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JOURNAL
OF
THE ASIATIC SOCIETY.

No. 55.—*July*, 1836.

I.—*Translation of a Támba Patra, which was found in a field of the village of Pipliánagar in the Shujálpur Parganá, by a Krisán engaged in ploughing, and presented to Mr.* L. Wilkinson, *the Political Agent at Bhopál, by the Jagirdár.*

[In a letter to the Editor of the Journal of the Asiatic Society.]

It is incumbent upon the friend of research to contribute every piece of information, however trifling, thrown in his way by accident or opportunity, by which the future researches of our successors in regard to the history and chronology of this country may be, in any degree, promoted. With this view I have thought it proper to forward to you the copy of an inscription on a copper plate lately found at Pipliánagar, in this neighbourhood. For the benefit of the purely English reader, I have added a translation, which, if found correct, you can also insert.

On referring to the Chronological Table of the rájas of Málwá, given in the number of your Journal for December 1835, I find that this plate confirms the Ujjain Inscription in regard to the order of succession of four princes.

Three other copper-plates have since been found at the same village. I have not yet had time to translate, or indeed to decipher them.

L. Wilkinson.

[This inscription does more than Mr. Wilkinson allows, for it adds four important names to the Ujjain list, below that of Jayavarma, (see *Chron. Tab.* 105.) and having a date A. D. 1210 to Arjun the last of the list, it exactly fills the blank between the former prince (1143), and Birsal in 1220. We have no space for comments, but we offer our best thanks to Mr. Wilkinson for his valuable contribution.—Ed.]

Transcript of the text in Modern Nágarí.

ओं नमः पुरुषार्थचूडामणये धर्म्माय ॥
प्रतिबिंबतया भूमेः कृत्वा साक्षात्परिग्रहं ।
जगदाह्लादयन् दिश्याद्द्विजेन्द्रो मङ्गलानि वः ॥ १ ॥
जीयात्परशुरामोसौ क्षत्रैः क्षुण्णा रणाहतैः ।
संध्यार्कबिंबमेयोर्वी दातुर्य्यस्यैति ताम्रतां ॥ २ ॥
येन मंदोदरीबाष्पवारिभिः शमितो मृधे ।
प्राणेश्वरीवियोगाग्निः स रामः श्रेयसेऽस्तु वः ॥ ३ ॥
भीमेनापि धृतौ मूर्द्धि यत्पादौ स युधिष्ठिरः ।
वंशाद्येनेंदुना जीयात्स्वतुल्यइव निर्मितः ॥ ४ ॥
परमारकुलोत्तंसः कंसजिन्महिमा नृपः ।
श्रीभोजदेव इत्यासीदासीमक्रांतभूतलः ॥ ५ ॥
यद्यशश्चंद्रिकोदेति दिगुत्संगतरंगिते ।
द्विषन्नृपयशः पुंजपुंडरीकैर्निमीलितं ॥ ६ ॥
ततोभूदुदयादित्यो नित्योत्साहैककौतुकी ।
असाधारणवीरश्रीरश्रीहेतुर्विरोधिनां ॥ ७ ॥
महाकालहकल्पांते यस्योद्दामभिराशुगैः ।
कति नोन्मूलितास्तुंगा भूभृतः कटकोल्बणाः ॥ ८ ॥
तस्माच्छिन्नद्विषन्मर्मा नरवर्मा नराधिपः ।
धर्माभ्युद्धरणे धीमानभूत्सीमा महीभुजां ॥ ९ ॥
प्रतिप्रभातं विप्रेभ्यो दत्तैर्ग्रामपदैः स्वयं ।
अनेकपदतां निन्ये धर्मोयेनैकपादपि ॥ १० ॥
तस्याजनि यशोवर्मा पुत्रः क्षत्रियशेखरः ।
त[illegible]जयवर्माभूज्जयश्रीविश्रुतःसुतः ॥ ११ ॥
तत्सूनुर्वीरमूर्धन्यो धन्योत्पत्तिरजायत ।
गुर्जरोच्छेद निर्बंधी विंध्यवर्मा महाभुजः ॥ १२ ॥
धारयोद्धृतया सार्द्धं दधातिस्म त्रिधारतां ।
सांयुगीनस्य यस्यासिस्त्रातुं लोकत्रयीमिव ॥ १३ ॥
तस्यामुष्यायणः पुत्रःसुनामश्रीरथाश्रियत् ।
भूपः सुभटवर्मेति धर्मैतिष्ठन्महीतलं ॥ १४ ॥
यस्य ज्वलति दिग्जेतुः प्रतापस्तपनद्युतेः ।
[illegible] मनाद्यापि गर्जन्गुर्जरपत्तने ॥ १५ ॥
देवभूयं गते तस्मिन्नंदनोऽर्जुनभूपतिः ।
दोष्णा धत्तेऽधुना धात्री वलयं वलयं यथा ॥ १६ ॥

बाललीलाहवे यस्य जयसिंहेपलायिते।
[illegible]स व्याजेन यशो दिक्षु विजृम्भितं॥ १७॥
काव्यगांधर्वं सर्वस्वनिधिना येन सांप्रतं।
भारावतरणं देव्याश्चक्रे पुस्तकवीणयोः॥ १८॥
तेन त्रिविधवीरेण त्रिधापल्लवितं यशः।
धवलत्वंदधु स्त्रीणि जगंति कथमन्यथा॥ १९॥

सएव नरनायकः सर्वाभ्युदयीशकपुरप्रतिजागरणके पिडिविडि ग्रामे समस्त राजपुरुषान् ब्राह्मणोत्तरान् प्रतिनिवासिपट्ट किल जनपदादींश्च बोधयत्यस्तुवः संविदितं यथा मंडपदुर्गावस्थितैरस्माभिः सप्तषष्ट्यधिक द्वादश शत संवत्सरे फाल्गुण १२३७

शुक्लदशम्यामभिषेकपर्वणि स्नात्वा भगवंतं भवानीपतिमभ्यर्च्य संसारस्यासारतां दृष्ट्वा तथाहि।

वाताभ्रविभ्रममिदं वसुधाधिपत्यमापातमात्रमधुरो विषयोपभोगः।
प्राणास्तृणाग्रजलबिंदुसमा नराणां धर्मः सखा परमहो परलोकयाने।

इति सर्वंविमृश्यादृष्टफलमंगीकृत्य मुक्तावसुस्थानविनिर्गताय वाजसनेयशाखाध्यायिने काश्यपगोत्राय काश्यपवत्सारनैध्रुवत्रिप्रवराय अवसाविकदेलग्राम प्रपौत्राय पंडितसोमदेवपौत्राय पंडित जैत्रसिंह पुत्राय पुरोहितगोविंदशर्मणे ब्राह्मणाय समस्तोपिग्रामश्चतुःकंकट विशुद्धः सवृक्षमालाकुलः सहिरण्यभागभोगः सोपस्करः सर्वदाय समेतः सविनिक्षेपो मातापित्रोरात्मनश्च पुण्ययशोऽभिवृद्धये चंद्रार्कार्णवक्षितिसमकालं यावत्परया भक्त्या शासनेनोदकपूर्वं प्रदत्तः तन्मत्वा तन्निवासिपट्टकिलजनपदैर्यथा दीयमान भागभोगकरहिरण्यादिकं देव ब्राह्मणभुक्ति वर्जमाज्ञाविधेयै भूत्वा सर्वममुष्मै दातव्यं सामान्यं चैतत्पुण्यफलं बुध्वाऽस्मद्वंशजैरन्यैरपि भाविभोक्तृभिरस्मत्प्रदत्तधर्मादायोऽयमनुमंतव्यः पालनीयश्च उक्तंच।

वहुभिर्वसुधा भुक्ता राजभिः। समरादिभिः। यस्य यस्य यदा भूमिस्तस्य तस्य तदा फलं॥

स्वदत्तां परदत्तां वा यो हरेत वसुंधरां। स विष्ठायां क्रिमिर्भूत्वा पितृभिः सह मज्जति इति कमल[illegible]लोलां श्रिय मनुचिंत्यं मनुष्य जीवितंच।

सकलमिदमुदाहृतं च बुध्वा न हि पुरुषैः परकीर्त्तयो विलोप्याः।

संवत् १२३७ फाल्गुणशुद्ध १० गुरौ रचितमिदं महापंडित श्रीबिल्हणसंमतेन राजगुरुणा मदनेन॥

Translation.

To Virtue, the most worthy object of desire to man, hail!

1. May the best of Bráhmans, who gives happiness to the whole universe by accepting a small portion of the earth as an emblem of the whole, give happiness to you.

[Or, may Shesha, who gives happiness to the whole world, upholding (by contact with) that portion (resting on his head), give happiness to you. Or, may the moon, who gives happiness to the whole world, and who receives (in an eclipse) the shadow of the earth, give happiness to you.]

2. May that Parashurâma, who gave to the Brahmans the whole earth, after it had become red as the setting sun, being drenched in the blood of the race of Cshatriyas prostrated in terrible conflicts, ever be praised.

3. May that Ráma, who victorious in battle, quenched in the flood of tears, caused Mandodari to shed the fire that burnt in the breast of the virtuous Sí'ta, when torn from her consort, give salvation to you.

4. May Yudhishthira, whose feet the valiant Bhí'ma kissed in humility, and whom Chandra, the founder of his race, formed wholly in his own likeness, live for ever.

5. The illustrious Rája Bhoja Deva, formerly reigned: he was the chief of the Paramár princes, and in glory equal to the conqueror of Kansa. He traversed the earth in victory even to its ocean limits.

6. On the appearance of this glorious king, the fame of all hostile princes in all regions of the earth faded into obscurity, as white water-lilies in a ruffled lake bowing their heads submissively, lose their brightness before the world-pervading glories of the rising full moon.

7. To Rája Bhoja succeeded Udayáditya, whose constant delight was in the pursuit of pleasure: he was singularly endowed with the virtues of a hero; and stripped his enemies of their glory and fame.

8. How many proud princes with their terrible armies did not this Rája overthrow in ever-memorable battles, which resembled the war of elements in the universal deluge by the rapid discharge of his irresistible and fast-flying arrows; or he was like the whirlwind, which rising up at the universal deluge by its irresistible force, overthrows whole ranges of terrific and inaccessible mountains.

9. After him succeeded Rája Naravarma, who smote his enemies to death. He was wise and steadfast in support of religion and virtue: a very paragon of excellence, and a perfect model to the princes of the earth.

10. He restored to religion, who stood infirmly on one foot in this iron age of guilt, its four-fold support, by making daily grants of land to Brahmans.

11. YASHOVARMA, the chief ornament of the Cshatriya tribe, succeeded to him: and to him succeeded AJAYAVARMA, distinguished by his wealth and victories.

12. His son VINDHAYAVARMA, glorious in his life, next followed. He was distinguished for his heroism, and by his personal prowess, and directed his ambition to the reduction of the country of Guzerát.

13. The sword of this warrior assumed a threefold edge, when upraised to yield protection to the three worlds.

14. His son AMUSHYAYANA, equal to Indra in glory, next ruled the people. SUBHATAVARMA, whose aim was directed towards confirming the people in the practice of virtue, succeeded to him.

15. The angered prowess of this conqueror, like the fiery rays of the sun, which exercised its thundering rage on the city of *Patan* in (or cities of) *Guzerát*, is witnessed to the present day in the forest-conflagrations that still prevail in the country.

16. On the ascent of this prince to heaven, his son, ARJUNA Rája, succeeded, who still holds on his arms the circle of this earth, as a bracelet encircles the wrists.

17. This prince, when still a child, put JAYA SINHA Rája to flight even in child's play; the eight Dikpáls (or rulers of the eight corners of the world) smiled at his success. Thus his fame reached the ends of the world.

18. He is a very treasure of poetry and melody. SARASWATI, delighted by the accomplishments of this prince, gave him her own lyre and her sacred volumes.

19. To whom but to him, who is equally renowned for the threefold virtues, learning, valour, and generosity, can we attribute the enlightenment of the three worlds?

To this Rája belongs all prosperity. By these presents he informs the officers of Government, all Brahmans and others, the patèl and rayats of the village of Piriwiri in the Shakapur parganá, that in the fort of Mandu, this day 10th Phálgun Shakla of the Samvat year 1267, he has given away this village in free gift, in commemoration of his accession, after the prescribed ablutions and due worship of SAMBHU, and with due regard to the fleeting vanities of this world.

20th verse. As the clouds are drifted along by the wind, so enjoyment from the senses lasts but for an instant: the life of man is like the dew-drop depending from the tip of a blade of grass; and virtue is the only friend that will avail in the world to come.

Thus reflecting upon the vanities of this world, he resolved to seek the (sure though) invisible rewards of a future state. He therefore gave this village to the Brahman **Govinda**, his purohit, the son of **Jaitrah Sinh**, the son of **Somadeva**, the son of **Delana Avasavika**, of the Tribe (Prawar) of **Káshyapa**, **Vatsára** and **Naidhruva**, of the family (*Gotra*) of **Káshyapa**, and a follower of the Madhyandina (or Wajasaneya) *shakha* or branch of the *vèdas*. He gave the whole village to its utmost limits, and all its groves of trees, with the full usufruct of its rents and revenues and rights, and of all the moveable property therein, including all right to trove property found therein, that he and his father and mother may increase in good works and in reputation. This gift is to last so long as the moon, and sun, and the earth shall endure, being duly made with consecrated water on a befitting record and with all reverence. Let the patèl and all the inhabitants of this village, bearing the royal generosity in mind, obey his orders, and make over to him the full usufruct of all the rights and dues heretofore paid to Government, excepting only such endowments and grants as have been made to temples and Brahmans. And let my descendants, and all who may succeed me, though not of my blood, well understanding that they will thereby be entitled to a participation in the fruits, preserve and maintain this grant in its integrity.

It has been written,—

" **Sagar** and many other princes have enjoyed the earth in succession. But every prince who maintains in full force any grant of a predecessor, acquires the same religious merit and title to future reward as the original donor."

And again it has been said,—

" The Rája, who resumes grants of land made as a religious offering either by himself or by former Rájas, shall become a vile worm to roll in filthy ordure: and shall drag his ancestors down into the same pollution. Reflecting that power and wealth and even life itself, are as unstable as the drop that floats on the leaf of the lotus, let every man refrain from detracting from the good name and from perverting the religious merits of another."

Written on Thursday, 10th Phálgun, Shudha of the Samvat year 1267, by the Ráj-Gúru **Madana**, and with the concurrence of the most learned Pandit **Bilhana**.

II.—*Note on the white satin embroidered Scarfs of the Tibetan Priests. By Major* T. H. A. LLOYD. *With a translation of the motto on the margin of one presented to the Asiatic Society. By* ALEX. CSOMA KÖRÖSI.

Having received lately, with a letter from Bútan, one of the silk scarfs mentioned by TURNER as in use in that country and Tibet, which, though rather dirty, is of a superior manufacture and more highly ornamented with figures of deities than those I have heretofore met with, I think it may be presented as a specimen to the Society. I can fully confirm TURNER's account of its general use in all intercourse, and am sorry I have not had any opportunity of ascertaining the origin of the custom, which is, I believe, peculiar to Tibet, Bútan, and Sikhim. I applied to Mr. CSOMA KÖRÖSI for an explanation of the sentences woven in at the ends of the scarf, and that gentleman has kindly transcribed and translated them. I enclose his notes on the subject, and to save you the trouble of a reference, I shall copy what TURNER says on this subject; to whose account I can only add that these scarfs are almost indispensable in all religious offerings, as well as on the occasions he mentions.

Titalya, 31*st May*, 1836. T. H. A. LLOYD.

Extract from Turner's Embassy, 4to. Edition, 1800.

Page 67. "We each advanced, presenting, one after the other, a white silk scarf, or long narrow piece of *pelong*, fringed at both ends, as is the custom in these countries, to the Rája, who, keeping his seat all the time, took them in his hand, and passed them to his *zempi*.

Page 71. We delivered to the *zempi*, or master of the ceremonies, a silk scarf for each of us, which being thrown across our shoulders, he dismissed us.

Page 72. An inferior, on approaching a superior, presents the white silk scarf; and, when dismissed, has one thrown over his neck, with the ends hanging down in front. Equals exchange scarfs on meeting, bending towards each other, with an inclination of the body. No intercourse whatever takes place without the intervention of a scarf; it always accompanies every letter, being enclosed in the same packet, however distant the place to which it is dispatched. Two colours are in use for this manufacture, which is of China, white and red: the latter is rather confined to the lower orders: the white is respectful in proportion to its purity and fineness; there are various degrees in both. I am yet ignorant of the origin of this custom, but shall endeavour, at some future time, to obtain an explanation of it.

P. S.—I may also mention that the *kow-tow* or nine prostrations, as knocking the head nine times on the ground, is in these countries always performed by inferiors approaching their superiors."

Translation of a Tibetan sloka, found on a white piece of China scarf, called བཀྲ་ཤིས་ཁ་བཏགས : *b,*krashis kha *b,*tags, or "*scarf of benediction.*"

༄༅། ཉིན་མོ་བདེ་ལེགས་ མཚན་བདེ་ལེགས། ཉིན་མའི་གུང་ཡང་བདེ་
ལེགས་ཤིང་།
ཉིན་མཚན་རྟག་ཏུ་བར་ལེགས་པའི། དཀོན་མཆོག་གསུམ་གྱི་བཀྲ་ཤིས་ཤོག

The same in Roman Character.

Nyin-mo *b*de-legs *m*ts'han *b*de'-legs, Nyin-mahi gung yang *b*de-legs-shing,

Nyin *m*ts'han *r*tag-tu *b*rda-legs-paḥi, *d*kon-chog *g*sum-gyi *b*kra-shis shog.

Translation.

"Blessed the day; blessed the night; the mid-day also being blessed: may day and night, always return (bring) the special favour of the three most precious (holy) ones."

(*Or thus;* the favour of the eminent three holy ones) the བར་ལེགས་པ being rendered, in Latin, *insignis, eminens,* &c.

Note.—On the cloth the བརལེགས is not sufficiently distinct; I took it first for བདེ་ལེགས as in the two former lines; but now I correct it as it probably stands on the cloth.

30th May. A. Csoma Körösi.

III.—*Note on the origin of the Armenian Era, and the reformation of the Haican Kalendar.* By Johannes Avdall, *Esq., M. A. S.*

While the Abyssinians, Babylonians, Egyptians, Persians, Bactrians, and other primitive nations of Asia, have each had their respective epochs, the people of Armenia, where the descendants of the second grand progenitor of mankind began to increase and multiply, are not without a national era of their own. It is not my intention to enter here into a description of the various eras that have from ancient times obtained among the people of the East, as they have been successfully treated of in the chronological works of learned authors. I shall only confine my observations to the origin of the Armenian era, and the reformation of the Haican or Armenian kalendar.

It appears from our historical records that the Armenian era originated in A. M. 3252, immediately after the coronation of the Armenian king **Paroyr**. **Arbaces**, prince of the Medes, it must be remembered, having availed himself of the assistance of **Paroyr**, and of **Belesis Nabonassar**, a prince of Babylon, succeeded in subverting the Assyrian kingdom, and proclaiming himself king of Assyria. Ensigns of royalty were conferred by the conqueror on both of his powerful allies, each of whom returned from the field of battle to his respective country. This memorable conquest of Assyria was signalised by the commencement of the era of **Nabonassar** in Babylon, and by the origin of the Haican era in Armenia, which dates 743 years before Christ.

The Armenian era was from the commencement regulated according to solar years, like the eras of the Babylonians, Medes, Persians, and Egyptians. The ancients were of opinion that the solar year consisted of 365 days, without paying any regard to the addition of the six hours, which formed the concluding part of each year. Consequently, the Armenian era, like that of **Yezdegird** the third of Persia, anticipated the Julian year by one day in every four years. They divided the year into twelve months, giving to each 30 days, and added five days at the end, called Աւելեաց *Aveliaz*, which signifies *added*, and is equivalent to the Greek word pagomen (παγομεν.) Thus the Armenian calendar year was made to comprise 365 days, leaving out the six hours. And according to this mode of computation all the Armenian years are *common*, but not intercalary. The following are the names and days of the Armenian months.

Armenian months.		*Days of the mths.*	*Total of the days.*
Նաւասարդ	Navasard,	30	30
Հոռի ...	Hori,....	30	60
Սահմի ..	Sahmi, ..	30	90
Տրէ ...	Trey,....	30	120
Քաղոց ...	Kaghoz, .	30	150
Արաց ...	Araz, ..	30	180
Մեհեկան	Mehekan,	30	210
Արեգ ...	Areg, ..	30	240
Ահեկան	Ahekan, .	30	270
Մարերի	Marery, .	30	300
Մարգաց .	Margaz, .	30	330
Հրոտից . .	Hirotiz, ..	30	360
Աւելեաց	Aveliaz,. .	5	365

Here in the order of the Armenian months are to be seen not only the number of days thereof, commencing from Navasard, which is the first month of the year according to the Armenian era, but also the total of the days of the year up to *Aveliaz* or Pagomen, which invariably consists of 5 days, even in leap years.

According to the above mode of computation, the month of Navasard will commence on the 24th of August in the year 1836, and after a lapse of four years it will begin on the 23rd of August 1840.

In this manner it will anticipate the Julian year by one day in every four years, and after a period of 120 years the difference between the Armenian and Julian epochs will be 30 days. The lapse of 1460 years will increase this difference to a whole year, and the beginning of Navasard will again fall on the 24th of August, the day on which it will have commenced in the year 1836.

It is stated in ancient Armenian chronological works, that the Armenian era was recommenced on the 11th of July, A. D. 552, on which day fell the first of Navasard. But the want of an intercalary day in the Armenian year creates a deviation of the beginning of the month of Navasard from the day of the Roman month, on which it originally commenced. We know on the authority of Armenian authors, that the month of Areg in the early part of the fifth century corresponded with the month of March. Nierses the Graceful concludes his letter to the Greek Emperor Emmanuel thus: "Written in the Armenian era 619, in the Armenian month of Areg, and in the Roman month of October" And in an old manuscript copy of the Armenian Ritual is stated thus: "Written in the Armenian era 670, in the month of Mehekan, which corresponds with the month of August."

In the year of Christ 551 the Armenian Kalendar was reformed by the Armenian Pontiff, Moses the Second, a native of the village of Eliward, in the province of Aragazotn, and eminently distinguished for his extraordinary talents and profound erudition. On his elevation to the pontifical throne, he devoted his attention to the reformation of the Armenian Kalendar. A council was accordingly convened by him in Duin, consisting of learned Bishops and scientific individuals, by whose co-operation he succeeded in remodelling the Armenian Kalendar, as much as the circumstances of the times permitted, by newly commencing the cycle. Thenceforward the Armenian nation adopted the reformed Kalendar, and generally began to reckon their years in accordance with the rule laid down therein. In order to know the Armenian era, deduct from the Christian era 551 years, and the remainder, whatever it may be, will be the Armenian era required. For instance, if 551 years be deducted from 1836, the remainder will be 1285, which is the present Armenian year.

It is usual with the people of Armenia to reckon the hours of the day from sunset to sunset, in imitation of the custom prevalent in ancient times amongst the Italians. The day, consisting of 24 hours, is called in Armenian Աւր *Aur*, which entirely corresponds in sound with the English word *hour!* In the Armenian language the hours of the day and night have respectively distinct names, which I shall state below.

Names of the hours of the Day.			*Names of the hours of the Nigh*		
1.	Այգ։	Aig,	1.	Խաւարակ։	Khavarak,
2.	Ծայգ։	Zaig,	2.	Աղջամուղջ։	Aghjamúghj,
3.	Զայրացեալ։	Zairazial,	3.	Մթացեալ։	Mithazail,
4.	Ճառագայթեալ։	Charagaithail,	4.	Շաղաւօտ։	Shaghavot,
5.	Շառաւիղեալ։	Sharavighail,	5.	Կամաւօտ։	Kamavot,
6.	Երկրատես։	Erkrates,	6.	Բաւական։	Bavakan,
7.	Շանթակող։	Shanthakogh,	7.	Խօթափեալ։	Khothapail,
8.	Հրակաթ։	Hirakath,	8.	Գիզակ։	Gizak,
9.	Հուր փայլեալ։	Húr Phailail,	9.	Լուսաճեմ։	Lusachiem,
10.	Թաղաթեալ։	Thaghathail,	10.	Առաւօտ։	Aravot,
11.	Առաղօտ։	Araghot,	11.	Լուսափայլ։	Lusapail,
12.	Արփող։	Arphogh.	12.	Փայլածու։	Phailazú.

It is recorded in the ancient annals of Armenia, that ARMENAC, the son of HAIC, had twelve brothers, who were respectively called by the names of the twelve Armenian months. He had also twenty-four sisters, who received the respective names of the twenty-four hours of the day.

The Armenians of British India as well as of other parts of the globe, have adopted the use of the old Julian style and months in mercantile transactions, and in their correspondence with Europeans.

IV.—*Conjectures on the march of Alexander. By* M. COURT, *ancien éleve de l'école militaire de St. Cyr.*

[Communicated by Captain C. M. WADE*.]

According to PLUTARCH, the first country through which ALEXANDER passed on leaving Hyrcania, was Parthia. I shall therefore set out from this province, which is supposed to be the modern *Khorasán*; and what confirms us in this supposition is, that to the south of Parthia was situated Tabiana, now *Thabas*, which town is to be found in this direction between two deserts. Another incontestable proof is, that the province of Margiana, which was contiguous to Parthia, is to be found situated in the country of *Meimané*, watered by the modern *Murg-áb*, called Margus by the ancients.

BARBIE' DU BOCAGE fixes the capital of the Parthian empire at Nicephorium, or *Nishapúr*. But I must here notice that the town of *Tún* may very probably be Parthonisa, of which he makes mention; and if this be the case, the tombs which are here to be found are those of the kings of Parthia.

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* We are indebted to the kindness of a lady friend for the translation of M. COURT's valuable Memoir.—ED.

It was in this province that the traitor Bessus seized the person of Darius, whom he subsequently assassinated. History does not record the spot where the assassination took place. From the statement of Plutarch, it appears Alexander sojourned for some time in Parthia. After he left this province his march became exceedingly irregular and confused, and we find no historical elucidation of it. Some historians say that he returned to Hyrcania; Plutarch is amongst those who give us this statement; others, however, relate that he marched into Bactriana. Rennel, the geographer, is of opinion, that on leaving the western provinces of the Caspian Sea he passed through *Aria* and *Zarangæi* to make the conquest of *Arachosia*, and that from thence he proceeded to direct his attack upon the Bactrians. I am led to be of this opinion; and what most strongly induces me to adopt it, is the death of Philotas, which was very much anterior to the murder of Clitus; and it is well known that the former perished in Zarangæi, and the latter in Sogdiana. Alexander on leaving Parthia passed through Aria, which is watered by the modern Arius, anciently called the *Heriroud*, and which passed by *Herat*. He here built a town, which I imagine must be that called *Obeh*, situated ten farsangs to the east of *Herat:* however, this latter town was built by Alexander, according to the reports of its inhabitants; but some geographers refute their statement by giving as their opinion, that Herat is not the Aria of the ancients. Barbié du Bocage says, that *Artacvana*, otherwise called Aria, was the capital of the province of this name. In regard to this, I must notice that in my travels from *Ispahán* to *Yezd*, I found the town of *Ardecon*, in its vicinity, in the same route, the equally ancient town of *Akda*, and quite close to this again was another called *Beni-bát*. Now these three towns bear in their names the strongest resemblance to those called Aria, Artacvana, and Bitaxia, that Barbie of Bocage fixes in Aria Proper. This country, of which I have just spoken, is situated between *Ardistán* and the province of *Yezd*, and is no other than the Isatœchœ (ισατοιχοι) of the Greeks, where the worship of fire and the institutions of the Magi were established. I must, moreover, notice that at the distance of two days' journey southward of the town of *Tún*, we enter the territory of Bucharia, and here meet with ruins, which may be attributed to the ancient Persians; but I must observe, that neither in this canton or in those of the three above-mentioned towns, is any river bearing the name of Arius to be found.

From Areia, Alexander marched into Zarangæi, now called Sigistan, but a vestige of its ancient name remains in that of the actual capital called *Zarang*, which is no other than the town of *Propthasia*, where Alexander put Philotas to death.

This town was situated at a short distance from the *Etymander*, now called the *Hind-mind*, which river empties itself into the lake *Zéré*, otherwise called *Néibendam*, known by the ancients under the name of the lake Arian. This river receives in its course that which flows from the territory of *Farrah*, and which is no other than the Pharmacotis of the Greeks, for there is not a doubt that *Farrah* was the ancient Phra, the country of the famous Rustam of Persia.

From thence he went into Arachosia, a province watered by the river Arachotus, which emptied itself into the lake Arciana, and which is the same as the *Aracandab*, which has its source in the canton of *Navor*, and which subsequently flows through the territory of *Candahar*, and from thence falls into the *Hind-mind* four farsangs below *Gerishk*. The town which was situated on this river, said to be built by Semiramis, ought to be found amongst the ruins of *Candahar*, or more probably it is the ruins of that town which are visible upon the river *Arcassan*, four farsangs below *Candahár* upon the road to *Shikárpur*. Two equally ancient towns are those of *Eskarganj*, and of *Sher-safa*, the ruins of which may be seen upon the road which leads to *Ghazní*. As to the Alexandropolis of *Arrokhaje*, it undoubtedly is old *Candahar*. Nicæa appears to me to be *Ghazní*.

The Macedonian conqueror must necessarily have passed through *Candahár*, as the several roads branch off from this town which lead to India, through *Cábúl*, *Ghazní* and *Shikárpur*; and moreover all the extent of country to the south of Arachosia, is nothing but one desert of moving sands, which occupy a distance of forty farsangs, stretching over as far as the country of *Neskhi* and *Karan*, which form a part of *Balúchistan*.

To the north of Arachosia we find the country of the *Paropamisæi*, separated from Bactriana, by a high chain of mountains, to which the name of *Caucasus* was given by the companions of Alexander, out of compliment to this prince, who wished to traverse them. Here they found a cavern that they transformed into the cave of Prometheus. I have been assured that a similar cavern does exist in the environs of *Candahar*, at the spot called *Khar-Jemshid-jan*. The mountainous part of the country of Parapamisæi is now inhabited by *Hazarés*, amongst whom exist a tribe of the Bactiaris, who doubtless are a descent from the intrepid Bactrians who offered such a valorous resistance to Alexander, and who repulsed him several times before they were made to surrender. I presume that this conqueror penetrated into this country, either by re-ascending the valley watered by the *Aracand-ab*, or by passing through the defiles of the chain of *Gulkau*, near *Ghazní*, where we may remark some dykes built here by

Sultan Mahmud Ghaznaví. In this passage he had to penetrate through heavy falls of snow before he could reach Bactria, the capital of Bactriana, which they say must have been the same as *Balkh.*

This country, according to Barbié du Bocage, extended to the south of the Oxus, a large river which stretched as far as the Paropamisus. It compromises Bactriana, properly so called, and the country of Margiana, of which I have already spoken.

Oxyartes, the father of Roxana, was king of the whole of this country.

It was at Bactria that Alexander condemned Bessus to have his nose and ears mutilated. Calisthenes was arrested at the place called Cariata. Plutarch relates, that Alexander was on the banks or confines of the Oxus when he first meditated the conquest of India.

The route which he pursued is, I imagine, the one now adopted by the caravans which pass from *Balkh* to *Cábul,* and which appears to be the only passable road through which this mountainous country can be traversed.

This road passes through the territory of *Bamiana,* a very ancient town, not far from which are to be found the prodigious ruins named *Gulgula.* Six kos further, we meet with others that are attributed to Zohak Shah; and at the place called *Siggan,* there are the remains of a fortress, the building of which the inhabitants attribute to Alexander. If this tradition be well founded, there is not a doubt that it must have been in this spot that Alexander built the town in the country of the Paropamisæi, and from whence he proceeded to Cophenes.

This starting point is a stumbling-stone for geographers, inasmuch as none of them have been able to determine its exact position. For, proceeding in their narration from thence, some state that he marched to *Cow,* which they mistake for Cophenes; and had he done so, he must have quitted the Paropamisæi, gone through the defiles of *Ghazní,* and have precipitated himself from thence to the cantons of *Gerdiz* and *Lougird;* then crossing the country of the *Bangishs* he would have proceeded to Peucelaotis by the route of *Kohát.* In this case *Borikrajan* must be Arigœum, of which we find mention made in history. But I would observe, that along this route no such important river as the Cophenes is to be found; and then again how improbable it appears that Alexander, who had such an immense tract of land to explore, would have ordered his generals Hephæstion and Perdiccas to conduct a division through a track so distant as that through Peucelaotis. It is then more probable that he must have taken the road to *Cábul,* and from thence dismissed his generals, with orders to proceed in their route to *Jelálábad,* and he himself pursued that which led to *Lagman,* and which answers the historical description, being very rugged and mountainous, but still such as to allow the cavalry to penetrate through it. From thence he could give assistance to that division of his army which were detached towards Peucelaotis.

Whilst pursuing this train of supposition, I cannot help observing that the Macedonian conqueror must of necessity have passed through *Cábul;* for its geographical position is so brilliant, so advantageous, that it is a military position which we cannot but suppose that he noticed, and therefore traversed it.

It is then only the more unaccountable, that to this day that no geographer has been able to ascertain the ancient name of this town, the foundation of which the inhabitants attribute to Keikobad. From the fertility and luxuriance of this territory, I am led to think that it must be the same as Cabura or Ortospanum, of which Barbié du Bocage speaks, describing it as "a town situated upon the route which led from the Alexandria of the Areians to India, and which was not very far from the Paropamisan Alexandria."

Rennel's opinion appears to be erroneous when he says, that the *Cow-mul* of Baber Shah is the same as the Cophenes, the principal branches of which, he adds, are rivers flowing from the *Ghazni* and *Guerdiz;* for the river *Ghazni,* according to the account given by its neighbouring inhabitants, empties itself into a lake which is situated at the south of *Moukkor,* in the canton of *Zermele.* As to the branch called the *Guerdiz,* it is no other than a narrow stream, and can scarcely be denominated a river. On the other hand, he adds, that the river of Cophenes was defined as the eastern boundary of the province of Paropamisus, of which Alexandria was the capital. I must observe, that from the direction the *Cow* takes in its course, it goes too far southward of the Paropamisus to form its eastern boundary; what he says there seems to have a more just reference to the province of Arachosia.

I am very tenacious, then, of my opinion, that the Cophenes must be the same as the river of *Cábul.* This river has its source in the country of the *Hazarés,* betwixt *Bamian* and *Cábul;* it has its fall in the mountains of *Meidan,* through which runs the road which leads from *Cábul* to *Balkh;* from thence it traverses *Cábul,* and receives below this town the river of *Shéikabad,* which also takes its source from the *Hazarés;* a little lower still it is enlarged by its junction with the *Panje-shir;* this takes place at the spot called *Teng-carun.* From thence it proceeds in its course through a mountainous part of the country, and empties itself in the western extremity of the valley of *Lagman*, where it receives the waters of the *Alumkhar*, which flow downwards from that territory. We follow it from thence into the valley of *Jelálibad*, where it is enlarged by its junction with the *Surkh-áb*, which rises in *Peivar;* and then again it receives the *Khonár*, which flows through *Kaféristán*. In leaving this deep valley it passes anew through the mountains of *Dekha*, and empties itself at *Micheni* in the province of *Pesháwar;* and when passing a short distance from *Ashnagar*, it receives below that town the *Jind*, which flows from the country of *Baajor*, then passes by *Nouchareh, Akhora* and *Jengír*, and from thence finally empties itself into the Indus; and here we lose it about half a league below the fortress of *Attok**. From *Cábul* to *Jelálábad* it is known by the name of the river *Cábul*, in the *Moumends* by that of *Khameh*, at *Pisháwar* they give it the name of *Nagouman*, and below that it is called *Landeh*, by the *Kattuks* and Yusufzies.

From its source to *Ashnagar* it abounds in rapids, which make it quite unnavigable in the rainy season, and more particularly so during the heavy falls of snow, which swell it out to a prodigious breadth. I have above concluded that ALEXANDER took the route to *Lagman*, after having ordered his generals to go to Pencelaotis.

The Aspii and the Thyræi that he attacked, appear to me to be the *Buzbins* and the *Touris*, who inhabit the mountainous part of the country which separates the valleys of *Lagman* and of *Jelálábad* from the territory of *Cábul*. As to the town of Arigæum, which was found beyond these mountains, it may be *Alichung*, a very ancient town situated in the valley of *Lagman*. That of Tigueri, which is here to be observed near the rivers of *Meitarlam*, is also of a very ancient date. The two rivers of Choe and of Evaspla, that he must have crossed in order to arrive, must in all probability be the *Penj-shir* and *Alumkhar*.

The valley of *Lagman*, as also that of *Jelálábad*, were formerly inhabited by an idolatrous people, who were driven after the first conquests of the Mahomedans beyond the chain of *Hindu-kou*, the Emodus of the ancients. They are now known under the names *Siáposh* or *Kaferis*, and the country that they inhabit is just below that of *Kaféristán*.

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* The latter part of its course may be traced on a map, which we have been permitted to copy from M. COURT's original survey on its way to the Asiatic Society of Paris, and which, with a few extracts from his geographical notes on the country, will appear in our next number.—ED.

These nations declare that they are descendants of the *Ghoris*, which name resembles greatly that of *Guræi*, of which notice is taken in history.

At *Jelálábád* ruins of a considerable extent are to be found: their origin is not, however, known. It is the same with those that may be observed three stages further off, near the defile of the *Kheibers*, and which are called *Pishboulak*. These last are situated on the northern range of the chain of *Sefidkoh*, and not far from thence is the village of *Azarno*, which one meets in the road from *Jelalábád* to *Pesháwar*. In these ruins are to be found some medals exactly like those of *Manikyála;* and from this I am led to believe that these towns must be of equal antiquity. It remains now to discover what were the names by which they were then called. The *Muminds* appear now to occupy the country of the Assaceni, against whom Alexander marched, after having crossed the Guræus. This river, which he crossed with great difficulty, appears to me to be the *Khonar*, a river the stream of which is very rapid and full of polished stones, like the *Alumkhar:* it flows from *Kaféristan.* If it be not this river, it must be that of *Cábul* itself, which here took the name of Guræus, from the Ghoræus which inhabited the banks, or rather the Jinde which traverses the country of *Bajru.*

From thence Alexander went into the country of Bajru, called by us Bijore. This town is situated 60 kos N. N. W. of *Pesháwar:* is very ancient, and we may there find many medals like those of *Manikyala.* It remains to be proved if it is really there that we find the Bazira of the Greeks. This mountainous country is traversed by the river *Jinde*, which divides it from the canton of *Suwát*, and which after having emptied itself into the defiles of the *Tengui* passes to the west of *Ashnagar*, throwing itself from thence into that of *Cábul.* If *Bajor* be the Bazira of the Greeks, it is in this country that we must search for the famous mountain of Aornus, the seizure of which was one of Alexander's most brilliant exploits.

From this country Alexander passed towards the Indus, and took possession of the town and fortress of Peucelaotis, which Hephæstion and Perdiccas had been besieging for upwards of a month.

Several geographers think that this province is the same as that of *Pesháwar.* In this case the Malamantus, upon which Peucela was built, is no other than the river *Barreh*, which flows downwards from the *Kheiber* mountains, and which loses itself in that of *Cábul.* Rennel, led into error by Forster, supposes that *Pakkheri*, which he calls *Pukkholi*, was the Peucelaotis of the Greeks. This last town was found at the west of the Indus, whilst *Pakkherí* was at the east of this stream, and at a considerable distance from it, and moreover in a mountainous country, where the Indus has never been able to change its course. Besides, Peucelaotis was contiguous to Bazira, a town that they suppose must have been *Bajúr*.

From Peucelaotis Alexander returned on his steps, directing his march towards the north-west, in order to investigate Aornus. After the capture of this rock, he made a second expedition into the country of the Assaceni, between Bazira and Peucelaotis.

Ashnagar, which several geographers mistake for Massaga, the capital of the Assaceni, appears to me to be the town of Nysa. Its vicinity to Cophenes, and above all what PLUTARCH states that ALEXANDER said to the Macedonians, who hesitated and seemed to fear encountering so deep a river, all corroborate my conjecture. I must, besides, observe, that three *kos* below this town, and on the borders of the *Cábul*, is the village of *Nysetta*, where there are some vestiges to be found. All the suburbs of *Ashnagar* are scattered over with vast ruins, of none of which we know the origin, and where we find some very ancient medals. The actual fortress of *Ashnagar* overlooks this territory.

In starting from thence to the Indus we meet no other river, with the exception of a small stream which flows from the *Babúzies*, and which passes between the *Hotti* and the *Kapourdigarhi* to throw itself from thence into the river *Cábul*, below the *Nouchareh*.

At six kos to the N. E. of *Ashnagar* is the mountain of *Behhi*, isolated upon a vast plain, and upon which may be remarked the ruins of a very vast town, which seems to be of most ancient date, and which, according to the reports of its present inhabitants, was the residence of the ancient kings of that country. Specimens of bas reliefs may there be found; also the remains of an aqueduct, by which thence the waters of *Ashnagar* were carried to the town. At eight *kos* to the north of *Behhi* we see the summit of a mountain, situated between the canton of the Babúzies and the massive ruins of a fortress, which was only accessible by a path cut through the rock.

This spot is called *Pelley*. At 18 *kos* N. E. of *Ashnagar* we see on the southern range of the mountain called *Kohganga* the vast ruins of a town, that the present inhabitants say was peopled by idolaters, and which is quite close to the existing town *Bazar*. At 15 *kos* to the east of *Ashnagar* is the actual town of *Kapourdigarhi*, which from its locality might well be the ancient Caspatyrus, the capital of the Gandarii, which is placed by our geographers to the east of Assaceni, on the western bank of the river Indus.

I have remarked, that close to this town is an inscription in characters quite similar to those we observe on the ancient Indian medals of *Manikyala*[*]. To the west of this town is the territory of *Hotti* or *Hoddi*, which received its name from an ancient sovereign of this country, who might have been the OMPHIS who surrendered himself to ALEXANDER.

On the western bank of the Indus ruins may be observed at *Pevur Toppi, Hound,* and *Mahamadpur.* Those of *Hound* are all striking, and there may be found blocks of marble containing inscriptions traced in characters quite unknown to the inhabitants.

As for the ruins of *Mahamadpur,* situated at the junction of the Indus and the river *Cábul,* they are, we are told, more than two thousand years of age. After having exhausted the above facts relative to the country of the *Youzoufzies,* I shall be led to form more than one conjecture on the true position of Bazira; but I have been quite perplexed by RENNEL, who says that "ALEXANDER after his arrival at the bridge made an inland excursion into the country situated on the western banks of the Indus, to visit the town of Nysa, and that he subsequently penetrated into the country situated between the two rivers of Cophenes and Indus."

Being quite devoid of all references or means of solving my doubts, I am obliged to adopt the supposition of this judicious guide.

As to the Assaceni who inhabit the lower part of the western bank of the Indus, they are only inhabitants of *Katteuk,* and the town of *Ora* is perhaps the same as Akhora. As to that of Sabissa or Capissa, we must seek for it in the canton of *Lachittiri,* or in that of *Kohát.*

As relates to Aornus, which is situated in this country, and of which ALEXANDER made himself master, it is probably the castle which was opposite *Attok,* and the vestiges of which we see upon the summit of the mountain: its foundation is attributed to *Raja-Hoddi.* According to some geographers, Attok is the town of Taxila; through which the army of ALEXANDER effected the passage of the Indus. If it be not this town, we must recognize it in that of Torbila: the locality of the ruins which we there remark lead me to form this conjecture. It is possible besides, that this name may have undergone some change in its orthography. We know that the Greeks were not exact in their mode of spelling the names of the towns and countries which they invaded.

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[*] We have written to M. COURT to request, if it be possible, that facsimiles may be procured, both of the inscription near *Ashnagar,* and of those on the marble blocks at *Hound.* The Pehlevi inscription copied by M. COURT from one of the Manikyala topes has excited very great interest at Paris: it would be very desirable to obtain a precise facsimile of it.—ED.

V.—*Experimental Researches on the Depressions of the Wet-bulb Hygrometer. By* JAMES PRINSEP, *F. R. S. Sec. As. Soc.*

At the first meeting of the British Association for the advancement of Science, the Committee appointed to draw up a list of desiderata in the various departments of science, included among the objects of meteorological inquiry an investigation of the theory of the wet-bulb hygrometer: and in the circular then prepared, and at the subsequent annual meetings repeated, the Meteorological Committee was pleased to compliment with its favourable notice the papers published anonymously on this subject in the Calcutta "*Gleanings in Science.*"

The requisition of the British Association appears to have remained unanswered until the Dublin meeting in August last, when Professor APJOHN, of the Royal College of Surgeons in Dublin, brought forward the results of his own experiments, and expounded a simple and elegant formula which he had in every case found to agree with them, and to be practically applicable to the various conditions of the problem.

Dr. APJOHN's papers are published in the Philosophical Magazine for March, October and December, 1835; and it is principally an observation in the opening of his memoir which induces me to revert to the subject. "In the first report," he says, "mention is made of a register of observations kept in the East Indies, which, as belonging to high temperatures, would necessarily exhibit great depressions, and would therefore be valuable as a standard of comparison; but I have in vain searched for the Calcutta Journal '*Gleanings in Science,*' in which they are said to be contained."

In one respect we may deem it fortunate that the sluggish circulation of our humble periodical had not attained the shores of Ireland; if to the want of the data which "the Gleanings" might have furnished we are indebted for the series of experiments undertaken by Dr. APJOHN; for the more varied these may be, and the more numerous the observers, the more confidence may reasonably be placed in any formula that may accommodate itself to the whole.

I might without vanity claim to my own share as large a portion of the labour of experimental investigation as has rewarded the patience of any observer of the wet-bulb indications; having, with little intermission, registered daily observations since 1822; but I am more anxious to claim for my lamented fellow labourer, Captain HERBERT, the merit of having treated the theoretical portion of the subject—I will not say in a more philosophical manner than had hitherto been followed, because GAY LUSSAC had before exercised his masterly hand upon it, but,—in a manner equally sound in principle and creditable to himself, considering that he had not the means of referring to the original memoir of the French philosopher, and that he had only the erroneous views of the *Edinburgh Encyclopedia* to guide, or rather to misguide, him.

In Captain HERBERT's first paper*, he reviewed with unsparing criticism the paralogistic reasonings of the Encyclopedist, Mr. ANDERSON, and pointed out the true basis of the wet-bulb depression so nearly in accordance with the views of Dr. APJOHN, of Dr. HUDSON his coadjutor, and of M. GAY LUSSAC, that it establishes the general correctness of all, although the particular formula which he proceeded to build upon it, naturally agreed best with the data that my own experiments, published also in the Gleanings of March 1829, had furnished to him. He had fortified himself for the investigation by previous study of the doctrine of the latent heat of gaseous bodies, upon which subject he had published a brief but luminous essay in the Oriental Magazine for September 1827; and certainly no subject has so much needed a sprinkling of rationality to lay the dust of unphilosophical hypothesis which even yet remains to obscure a plain question; so much so, that Dr. HUDSON, one of our Dublin competitors, while he acknowledges the dependence of the problem on the relative capacity for heat of air and aqueous vapour, " will not dwell on this method nor the corrections it would require, placing no reliance on the truth of the requisite assumptions†."

But before entering into a review of the various theories that have been adopted by others, it may be preferable to describe in as succinct a manner as is consistent with clearness, the course I originally pursued to supply the experimental requisites for calculation, and upon which I ventured to form a table‡ for the reduction of wet-bulb indications to hygrometric degrees in 1828-9§. I have recently concluded a second and even more extended series of similar experiments, with the advantage of superior means and apparatus, which have enabled me to prosecute some branches of the inquiry that I believe have not before engaged sufficient attention.

In all hygrometric speculations it is usual to consider the state of extreme moisture, or the point of aqueous saturation of the air, as represented by 100°; while extreme dryness, or entire absence of aqueous vapour, is expressed by 0°. The intervening degrees comprehend every intermediate state of moisture that can possibly occur, and conveniently express the percentage of actual moisture present, or as it is more scientifically termed, the *centesimal* tension of the vapour.

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* Gleanings, Vol. I. p. 45.

† Phil. Mag. Vol. VII. p. 259.

‡ Gleanings, Vol. I. p. 81.

§ Before this period in 1827, I furnished a " table of multipliers" for reducing the depressions into aqueous tensions, calculated from three years meteorological observations at Benares with this instrument and the hair hygrometer. The Royal Society, who did me the unexpected honor to publish my registers, retrenched this table, and the notes which accompanied it. They had been, however, in the mean time printed in the Calcutta *Oriental Magazine* for March, 1827.

The point of saturation on the wet-bulb instrument (100) is indicated by 0°, because evaporation, and the cold consequent on it, then ceases. The questions to be solved then are, 1st, What is the maximum depression, which corresponds to perfect dryness (0) in the assumed scale, for every temperature?—and 2nd, What is the value of each intermediate degree (Fahrenheit) of depression of the wetted thermometer in terms of the *centesimal tension* or 100 hygrometric degrees above alluded to?

I. There is one very easy method of attaining the first object: viz., by exposing a wet-bulb thermometer to a current of perfectly dry air of various temperatures. This was the mode pursued by GAY LUSSAC between the temperatures 32° and 70°, in 1827: by myself in 1829, between 70° and 140°, and recently continued up to 700° Fahrenheit: it is the plan proposed to be pursued by Dr. HUDSON*, and employed in the test experiments of Professor APJOHN in 1835†. In fact, this is the only accurate plan of testing the maximum depression, which is to represent 0° on the hygrometric scale: for the exposure of a wet-bulb thermometer in *still air* dried to the utmost, fails to produce a maximum, the instrument being necessarily surrounded with a medium not perfectly dry. Dr. APJOHN makes the error by this method $\frac{1}{8}$th; I have found it about $\frac{1}{10}$th.

II. The second question, as to the value of intermediate depressions? may be ascertained by drying the air to various points, as 20, 30, 40 per cent. which can be done by exposing it to various saline liquids, or more conveniently to sulphuric acid of different strength, and then submitting the thermometer to a current of it as before. This mode was used long since by M. GAY LUSSAC in testing the value of the degrees of SAUSSURE's hair hygrometer, and it was followed by myself in a repetition of the same train of experiments in 1825‡. To obtain, however, an equable current of wholly or of partially dried air for a sufficient duration of time, is by no means easy; nor do I think that air merely passed through a tube containing sulphuric acid or chloride of lime, without remaining in protracted contact with it, would be thoroughly deprived of moisture. At any rate, to ensure confidence, there should be the means at hand of recording its actual state. M. Gay Lussac merely dried his air by chloride of lime, and his depressions will be seen to be all below the mark.

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* Phil. Mag. Vol. VII. p. 260.

† Ditto, p. 271.

‡ See BRANDE's Journal of the Royal Institution, XXII. 28.

Professor Apjohn states, that he pressed air from a caoutchouc bag through three of Wolfe's bottles, passing it thrice through the acid on its way to the thermometers. This must have been inconvenient and difficult to regulate, and the knowledge of the real condition of the air was withheld; although there can be little doubt that it was thoroughly dried. My own method was to dry the air previously for days or even weeks in a large gasometer, whence it could be driven in a very uniform current. The secret of the facility I enjoyed in this respect lay in the substitution of *cocoanut oil* for *water* in the reservoirs of my gasometers, which not only prevented the accession of moisture, but preserved the gas unaltered for any length of time;—I have fearlessly lighted a jet of hydrogen that had stood *two years* in my gasometer!

There are other modes of obtaining intermediate stages of dryness: the most obvious is by using the atmosphere itself of a dry or damp day, first ascertaining by Dalton's dewpoint experiment its actual hygrometric state, and noting the corresponding indication of the wet bulb thermometer; the averages of a good meteorological register are of this kind. Again, when damp air is artificially heated by passage through a warm tube, the capacity of the warm air for water being increased while the dew point remains unchanged, an effect tantamount to using drier air may be obtained and exactly estimated. The rarefaction of air also, (in the absence of the means of fresh supply of water) produces a measurable diminution of the ratio of humidity per given volume. These simple methods have been used by all experimenters, particularly by Leslie himself, the original projector of the evaporation-hygrometer.

In describing, therefore, my experiments directed to the two main inquiries, it will save some circumlocution to designate the methods pursued as, 1st, dry air current; 2nd, current of air having given aqueous tension; 3rd, heated air of known tension; 4th, rarified air do; and 5th, dew-point comparisons.

But there are other important branches of inquiry necessary besides the above two, ere we can hope for a formula to satisfy all conditions of the wet-bulb problem.

III. The experimental effect of diminished and augmented atmospheric pressure?

IV. The amount of depression in other gaseous media? and

V. The effect of greater or less velocity of the air on the temperature of evaporation? This effect has been sufficiently examined by

DALTON himself, as regards the *quantity* of water evaporated. Theoretically, however, it has no influence on its temperature; and this is confirmed by experiment, under certain limitations.

With such an appalling complication of influences to be traced out, it is hardly to be wondered at that M. GAY LUSSAC himself should have given up the prosecution of the wet-bulb problem, or that the Editor of the Royal Institution Journal* should have joined in its condemnation at a time when the elegant method of DANIELL was winning general favor. Nevertheless, independently of its direct preferability as the most simple mode of registering the humidity of the air, the problem itself is of the highest importance, in the solution not only of very many phenomena in pneumatics and meteorology, but of such standard doctrinal points of theory, as the latent heat of gases and steam; and others of practical utility—as the artificial production of ice and cold. I shall have occasion to adduce a few illustrations ere I conclude; but I must now proceed to my first series of experiments.

§ 1. *On the curve of maximum depression.*

The apparatus used for drying the air is sectionally depicted in Plate XXI. fig. 1, where *a* is a dish containing concentrated sulphuric acid enclosed in a 120 pint gasometer. Another similar dish rests in the glass double bell receiver *b*, wherein are suspended a hair hygrometer (the only instrument applicable as a tell-tale, and indeed an invaluable hygrometer for every purpose) and a delicate thermometer. Through this receiver the air of the gasometer passes to the stopcock and short glass tube *c*, in which is placed a small thermometer, covered with muslin and dipped in distilled water at the moment before the experiment commences.

The only difference in the order of M. GAY LUSSAC's experiments, being, as I have stated above, that he employed chloride of lime *without a tell-tale hygrometer*, while in my first Benares series I employed the same salt *with this addition*, it would be easy to apply to that philosopher's results the correction I found necessary for the want of complete desiccation in my case. At all events, as his series comprehends low temperatures, which were beyond my reach in India, it will render my review of the question more complete to insert his valuable table, converting the centigrade expressions into those of Farenheit's thermometer. In the fourth column I have added the aqueous tensions† at the wet-bulb temperature; and in the fifth, the quotients of the depressions divided by these tensions, which will be found to be the key to the formation of a *formula* for the problem.

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* Jour. Roy. Inst. XV. 296.

† By BIOT's formula founded on DALTON's experiments, and published in the Edinburgh Encyclopedia, Mr. ANDERSON's article *Hygrometry*.

Tab. I.—*Depressions observed by M. Gay Lussac.*

Temp. of dry air	Wet-bulb therm.	Depression wet-bulb	Aq. tens. at t'.	Qut. of D ÷ f'	Temp. of dry air.	Wet bulb therm.	Depression wet bulb.	Aq. tens. at t'.	Qut. of D ÷ f'
t	t'	D	f'		t	t'	D	f'	
°	°	°	in		°	°	°	in	
32.0	22.0	10.0	.139	72	57.2	38.7	18.5	.252	73
33.8	22.8	11.0	.143	76	59.0	39.5	19.5	.260	75
35.6	24.1	11.5	.153	75	60.8	40.6	20.2	.268	75
37.4	25.4	12.0	.157	76	62.6	41.7	20.9	.280	75
39.2	26.9	13.3	.166	74	64.4	42.9	21.5	.292	73
41.0	27.9	13.1	.172	76	66.2	44.0	22.2	.304	74
42.8	29.1	13.7	.179	76	68.0	45.1	22.9	.316	72
44.6	30.2	14.4	.186	72	69.8	45.2	23.6	.317	74
46.4	31.5	14.9	.195	77	71.6	47.3	24.3	.340	71
48.2	32.7	15.5	.204	76	73.4	48.4	25.0	.354	70
50.0	33.9	16.1	.213	75	75.2	49.5	25.7	.363	71
51.8	34.9	16.9	.220	77	77.0	50.5	26.5	.380	70
53.6	36.1	17.5	.231	76					

Average ratio of depression to aq. t., 74

It will be remarked, that with exception of the three or four last experiments, the depression follows a nearly uniform ratio to the aqueous tension, being 74 times greater. The air in the last four was doubtless not quite so dry as in the others; for in my own first series, which begins nearly where the French table leaves off, the depressions are found considerably in excess of M. Gay Lussac's results.

In the series in question the presence of the hair hygrometer enables me to make an approximate correction for imperfect dryness founded on a coincidence, which will be explained hereafter, between the curve of depressions and the curve of the hygrometer, so that nine degrees of the latter + or —, for instance, will nearly represent 9 per cent. + or—in the depression, near the dry extremity of the scale*. The barometric correction will be also explained further on.

Tab. II.—*Maximum Depressions determined at Benares.*

Temp. of dry air	Wet-bulb Therm.	Observed depression.	Barom. at 32°	Hair Hygrom.	Corrected depression.	Corrected wet bulb	Aqueous tens. at t'	Quotient of
t	t'	d	B	H	D	t'	f'	D ÷ f'
°	°	°			°	°	in	
72.5	47.2	25.3	29.43	9.5	27.5	45.0	.315	87
75.0	48.2	26.8	.52	9.5	29.3	45.7	.321	91
78.5	52.1	26.4	.30	9.5	29.3	49.7	.369	78
82.6	54.8	27.8	.26	9.5	30.3	52.3	.403	75
83.5	54.5	29.0	.25	8.	31.3	52.2	.402	77
84.7	55.0	29.7	.30	9.5	32.3	52.4	.405	80
85.0	55.0	30.0	.30	8	32.2	52.8	.411	80
85.0	54.8	30.2	.20	8	32.5	52.5	.407	80
90.2	56.8	33.4	.15	9	36.1	54.1	.429	82
90.3	56.7	33.6	.15	8	35.9	54.4	.434	83

In continuation of the foregoing, I will now give the Calcutta series, in which sulphuric acid was used in lieu of chloride of lime, and a greater dryness consequently attained; though in some cases I had not the patience to wait until the hygrometer marked 0: in fact, if it did, there was usually enough of moisture in the passages of the gasometer to cause a fall of 1 or 1½ degrees in the tell-tale hair hygrometer, ere the air reached the vent.

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* This mode of correction was not adopted in my former paper, and the depressions were consequently too low.

Tab. II. *2nd pt.—Maximum Depressions determined at Calcutta.*

Temp. of dry air	Wet-bulb Therm.	Observed depression	Barom. at 32°	Hair Hygrom.	Corrected depression.	Corrected wet-bulb	Aqueous tens. at t'	Quotient of
t	t'	d	B	H	D	t'	f'	D ÷ f'
°	°	°			°	°	in	
94.8	57.8	37.0	29.67	5	38.7	56.1	.459	84
94.6	57.3	37.3	.51	1 ?	37.7	56.9	.471	80
96.4	58.4	38.0	.43	2	40.0	56.4	.462	82
92.0	56.1	35.9	.50	3	37.0	55.0	.442	84
88.7	54.4	34.3	.55	3	35.2	52.5	.406	86
87.0	54.8	32.2	.44	4 ?	33.4	53.6	.420	79
83.1	52.1	32.0	.50	2	32.5	50.6	.381	85
88.2	54.5	33.7	.46	3	34.6	53.6	.420	82
82.6	51.7	30.9	.50	2	31.4	50.2	.376	81
80.9	51.1	29.8	.55	1	30.1	50.8	.384	78

The same uniformity in the quotients of the last column will be remarked in these two tables, but the average is now 81.8, considerably higher than the Paris result.

Having thus by the ordinary atmospheric temperature of a Calcutta laboratory in May, brought up my train of observations to 96°; and finding that the depressions so much exceeded those for the same portion of the series ascertained at Benares by suspending a wet-bulb thermometer in a vessel of sulphuric acid heated successively from 90° to 140°*, I devised the following method of extending the dry-air current series to temperatures still more elevated.

In the first place, the gas-pipe of the gasometer was encased for about four feet of its length in a larger leaden pipe connected with my small steam engine, so that a current of steam could be maintained in the latter during the continuance of the experiments, as is shewn in fig. 2. Pl. XXI. The extremity of the gas-pipe terminated in a glass tube holding, first, a dry thermometer, and an inch further on, the wet-bulb thermometer, inserted through corks.

On letting on the steam, (the two thermometers being stationary at 92°,) one began to rise rapidly, while the other fell very slowly. I could not, however, succeed in getting the former to rise beyond 190°, though the steam itself was at 215°. The wet-bulb then stood at 85°.0 and it fell to 80°.4 at 180°:—80 at 170, and 79.5 at 166. The

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[*] See Gleanings, I. 79. I purposely exclude these results in the present place, lest they should confuse the view; but they are, nevertheless, valuable in another sense, as shewing the difference, between the depression in calm air and in a current.

fluctuations of the dry thermometer being so considerable for a nearly stationary temperature of evaporation, it was somewhat difficult to determine the exact terms of coincidence; but the above are selected as the best from a great many readings recorded in my note book.

In a second experiment with air containing $\frac{6.0}{100}$ths of aq. ten. at 94°.3 (= $\frac{7}{100}$ ths at 170°) the dry thermometer became stationary at 170°, with the wet at 87°.7.

In a third trial, aq. ten .65 at 94.6 (= $\frac{6.5}{100}$ at 180) the stationary points were 180, and 90.

In a fourth, dew-pt. 74.3 (aq. ten. = 4.4 at 190) the same points were 190 and 92.2—Bar. 29.50.

Barometer	Thermom. in curt. of air. °	Wet-bulb Thermom. °	Observed depression. °	Cen. aq. tens.	Corr. for do.	Aqueous tens. at t'	Quotient $D \div f'$
29.55	190	85	105.0	0 ?	0 ?	1.17	89
	180	80.4 ?	99.6	0	0	1.01	98 :
	170	80.	90.	0	0	1.00	90
29.50	190	92.2	97.8	.044	+ 7.2 ?	1.17	89
	180	90.	90.	.065	+ 7.4 ?	1.12	87
	170	87.7	82.3	.07	+ 7.7 ?	*1.00	70

Observing the very rapid increase of the evaporating depression with the rise of the temperature, I perceived that I might safely carry my experiment to much higher limits than the boiling point of water. I accordingly next passed the current of dry air through a porcelain tube maintained at a bright orange heat in a Black's furnace (fig. 3, Pl. XXI.) At the further end of the tube a lateral hole was perforated to admit the bulb of the thermometer, coated with two-fold muslin that it might hold a larger supply of moisture. It was necessary to watch the experiment carefully, as, the moment the water was removed, a sudden rise took place, which would have otherwise broken the thermometer, while the cloth and cork were instantly charred with the heat. The actual temperature of the dry current was then estimated in the following manner: a thermometer, with the tip of its stem left open, was held mid-tube in the position previously occupied by the wet-bulb. In a few minutes the mercury boiled off, shewing that the temperature somewhat exceeded 656°. A very thin slip of tin was instantly fused: one of lead was then held within the tube, but it required to be passed a little in advance of the position of the wet-bulb ere it melted:—we may therefore assume the heat of the dry air to have been under 700°. Two experiments agreed precisely in giving the temperature of evaporation 145°. With a very rapid current the wet-bulb thermometer fell to 144°, but probably the air had not then time to get thoroughly heated in traversing the furnace.

There would have been little satisfaction in carrying this train of research further, because of the difficulty of measuring the temperature; otherwise it is evident that the coated thermometer might be safely trusted in a much greater heat, ere it would itself reach even the boiling point of water under the ordinary pressure; an illustration of which will be hereafter mentioned, but, not being strictly experimental, it cannot be introduced here.

Having however accumulated abundant data for the formation of an experimental curve, I may proceed to throw them together in the form of a diagram (fig. 4.), and to compare at once the results with the various formulæ that have been proposed by different philosophers.

As, however, each author has employed different algebraic characters for working out the problem, it will be better first to bring them to common terms, adopting the most simple expressions: thus let

t = the temperature of the air.

t' = the temperature of a wet-bulb, or of an evaporating surface.

t'' = the temperature of saturation, or the dew-point.

then f, f', and f'' may be conveniently used to represent the *force of aqueous vapour*, at t, t', and t'' respectively. d, the depression, is of course $= t - t'$, and not absolutely wanted, but it is frequently a more convenient expression; and D may be also used to distinguish the *maximum depression* in dry air, when $f'' = 0$.

Now supposing the increasing temperatures, t, to be represented by the abscissæ of the divided line TT, the observed depressions may be laid off as ordinates, through the apices of which a dotted line being drawn, will form an *experimental curve of maximum depression*, for which a mathematical expression is required.

Next, to collect the materials for the theoretical curves to be entered in the same diagram, we must take a cursory view of the existing theories.

Leslie, who must be regarded as the inventor of the wet-bulb hygrometer, deserves the precedence in this inquiry. His experiments were conducted by approaching a dry and a wet thermometer together gradually towards a heated furnace in a closed chamber. The Professor calculated the hygrometric conditions of the air as its heat rose; and on comparing his results, he was led to the conclusion, that as the caloric necessary to convert water into steam was = 6000 degrees of his instrument, and the capacity of air was $\frac{3}{8}$ths that of water, the same measure of heat would raise an equal mass of air, 16000 degrees; and consequently that at the temperature of the wet-bulb, t', air would take up the 16000th part of its weight for each degree marked by his hygrometer, which is equal to the 2880th part for each degree of depression by the common thermometer.

Now p (Barometric height) may be substituted for the weight of the air, and f' for the saturation weight of vapour at t' : therefore by the above data f' will be $= \frac{d \times 2880}{30} = \frac{d}{96}$ or, (as d is the object sought) d (or D) $= 96 f'$, at the pressure 30.

This simple enunciation, making D in the direct ratio of f', is unduly criticized by M. Anderson in his elaborate treatise on hygrometry in Brewster's Encyclopedia; but while in reality it will be found closely to agree with the experimental data, and with the subsequent formulæ of others, the new expression deduced from "the laborious investigations" of the critic, turns out to be wholly at variance with experiment, except accidentally at the temperature of the single trial he has himself recorded: his formula (omitting the correction for the barometer) is $D = \left(36 - \frac{D}{10}\right)(f - f'')$ which, when $f'' = 0$, is convertible into

$$D = f \times 36 - \frac{D}{10}$$

making the depression depend on the tension at t, instead of at t'.

M. Gay Lussac's memoir should, I fancy, precede Mr. Anderson's. It was written in 1815, though not published until 1822. The rationale of his formula is explained in these words :—

"Le froid produit (par l'evaporation) est à son *maximum* lorsque le calorique absorbé par la vapeur est égal à celui que perd l'air pour se mettre en équilibre de temperature et de pression avec elle, plus à celui versé sur la surface évaporante par les corps environnans ; mais la quantité de ce dernier, lorsque le froid produit n'est que de quelques degrés, est très petite en comparaison de l'autre, et peut etre negligée." If, therefore, on one side the latent heat of vapour (l) and its density (δ) be combined with its weight (f') ; these should counterbalance the weight of air $(p - f')$ combined with its capacity (c) and the number of degrees cooled (D or $t - t'$) ; that is, $f' \delta l = (p - f')(t - t')c$ or, at 30 inches, $f' \times .625 \times 960 = 30 - f' \times d \times .2669$ and

$$D = \frac{2247 f'}{30 - f'},$$

depending as before on f'. With *dry* air, the divisor in this equation should, I imagine, lose $-f'$ altogether, which would elicit the value of d, $= 74.9 f'$; a value lower than Leslie's, but almost exactly agreeing with M. Gay Lussac's own experiments detailed in Table I.

Captain Herbert's formula was founded on the proposition that "when the equilibrium or stationary point of the wet-bulb is attained, the indefinitely small decrements of caloric from evaporation are balanced by the indefinitely small increments arising from conduction and radiation in the equally small moments of time." Now as Messrs. DULONG and PETIT have shewn that the rate at which a body cooled below the temperature of the air (by conduction and radiation) reacquires heat, is proportional not to the simple difference of temperature, but to that difference raised to the 1.233 power; hence it should follow that the amount of evaporation should increase in the same ratio; "but," says he (page 191), "how determine the rate of evaporation? One of the most striking phenomena of evaporation is the cold produced by it; the consequence of the absorption of heat attending the conversion of water into vapour. This depression of temperature must evidently be as the evaporation; or rather the momentary depression will be in proportion to the rapidity of the evaporation. The momentary depression is equal to the momentary increment of heat which would take place were the cooling power of evaporation suspended, and the moistened bulb thermometer allowed to assume the temperature of the air. This is known to be as the 1.233 power of the total depression: the evaporation will then be as the 1.233 of the depression." But the evaporation is (according to DALTON), as the tension of the evaporating surface *minus* the tension of the vapour in the air (= 0 in dry air:) then finally this tension will be as the 1.233 power of the depression: or

$$d\,m = \sqrt[1.233]{f' - f''}$$

m being a co-efficient depending on the latent heat of air and the ratio of the evaporation to the weight and surface necessary to produce a fall of one degree; which Captain HERBERT deduced from the experiments made at Benares. The complete formula, at 30 inches, for dry air becoming

$$D = \sqrt[1.233]{\frac{L f'}{6.056}}$$

in which L (proportion of mass of water to the vapour required to be evaporated to produce a fall of 1°) is derived from a table published in the Oriental Magazine, September 1827; it varies from 898 at 40° to 1005 at 90° and 1250 at 1800. The divisor 6.056 would require to be diminished to 5.4 to suit the present experiments, but neither would the formula then agree so well as the more simple one of LESLIE and others. The fact is, that the experimental curve is of so simple a nature, that any geometric series of moderate divergence may within limits be accommodated to it by proper co-efficients: thus my own formula was merely an empiric one formed to represent the experimental data of Benares and those of GAY LUSSAC in the most ready manner, expressing the depressions in terms of the temperature of the air: the former increasing geometrically with arithmetical increments of the latter, I found $d = \frac{t'^{1.275}}{8.91}$; but this does not correspond at all with the higher depressions now ascertained experimentally, though it suits those of the former series. We may, therefore, reject it without further regard: nor need we pause to consider BERZELIUS' more simple rule, founded, he says, on the experiments of AUGUST, BONENBERGER *and others*, viz. that the temperature of the wet-bulb is always an arithmetical mean between that of the air and the dew point, or $t'' = 2t' - t$, which, except at certain points of the scale, is utterly erroneous.

We now come to Professor APJOHN's formula, which will be found not to differ essentially from those of LESLIE or GAY LUSSAC. It is $f'' = f' - m\, d$ (at 30 inches pressure) where m is a co-efficient as usual "depending upon the specific heat of air, and the caloric of elasticity of its included vapour," of which the arithmetical value deduced from received data is .01149 or the equivalent vulgar fraction $\frac{1}{87}$ at 50° Farh. Now in the case of extreme dryness assumed for our comparison, $f'' = 0$; therefore $d = 87 f'$; an expression entirely agreeing in form with LESLIE's, but rather smaller in amount, and more nearly, as will be seen, in accordance with the experiments of Tables II and III.

Dr. HUDSON arrives, from different premises, at nearly the same method as Professor APJOHN*. He calculates a column of the "relative quantities of heat (Q) necessary to supply vapour of saturation to dry air at each degree of wet-bulb temperature, t', and then finding from experiment at one point ($t_{,} = 61°$) the actual depression (51.124 APJOHN), the depressions at other degrees he assumes to be direct proportionals, or Q (at 61°) : Q' : : 51.124 ; D.

Now it is evident that in this equation, as in most of the preceding, Q (whence D is directly derived) necessarily depends on the aqueous tension, f', affected by the indispensable co-efficient of the latent heat of water, vapour and air, or as Dr. HUDSON deduces from DESPRETZ's values, $Q = \frac{1168 - t \times 22 f'}{448 + t}$†. For ordinary temperatures, Q on an average will be found $= 50\,f'$ and D is assumed from APJOHN's experiments $= \frac{51.124\,Q}{25.9} = 1.9\,Q$; so that by this formula (at 30 inches,) $D = 98\,f'$, nearly; being a little in excess of LESLIE's original formula. This is attributable to APJOHN's single experimental depression assumed as the basis of the whole calculus being somewhat too great.

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* Phil. Mag. Oct. 1835, p. 257.

† If the theory which makes the sum of the latent and thermometric heat for gaseous bodies a constant quantity be correct, Dr. HUDSON's expression does

It cannot be said after the preceding list, that the wet-bulb theory has been neglected. On the contrary, it may be rather feared that the researches of its earliest investigators, particularly those of LESLIE and GAY LUSSAC, have been neglected; for it is certain that their formulæ are nearly as well adapted to the actual phenomena as any that have been since suggested. This cannot be more strikingly exemplified than in the accompanying diagram, (Pl. XXI.) which has been filled up from the preceding data. The abscissæ represent the temperatures *(t)*, and the ordinates the maximum depressions in dry air (D). The experimental determinations are shewn by dots*, and the principal theoretical curves delineated, are distinguished by the name of their authors.

The following table also embraces a comparative view for every ten degrees of temperature, the experimental entries being adapted by interpolation from the observations before set forth.

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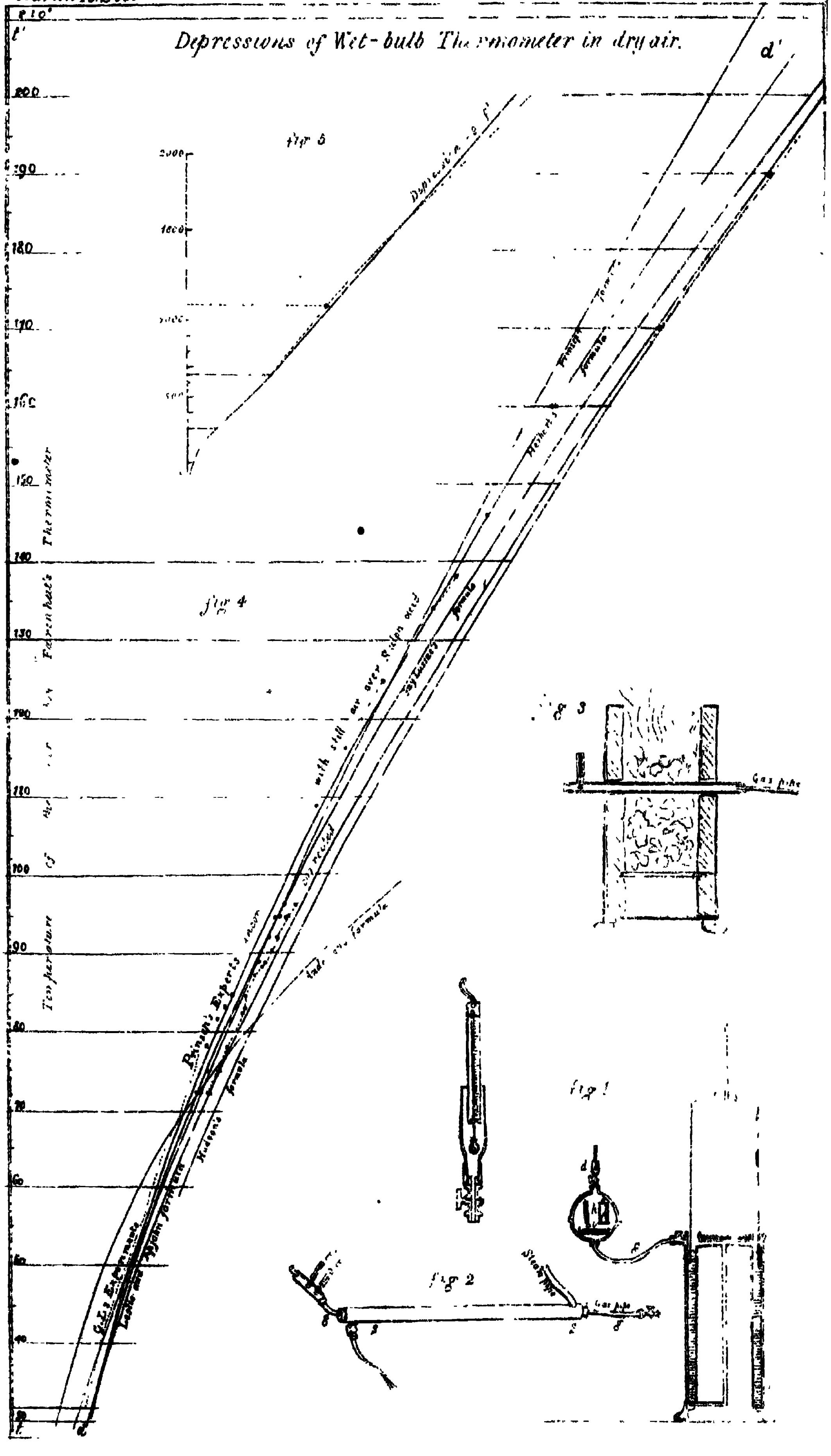
not seem open to objection. The *volumes* of air at different temperature being as $\overline{448 + t}$ directly: the *densities* are as $\overline{448 + t}$ inversely; and for any other pressure $\frac{f}{30}$ the density of air at t will be $\frac{660f}{\overline{448 + t} \times 30} = \frac{22f}{448 + t}$. Further, allowing the atomic theory of volumes, the *density of vapour* at t will be $= \frac{.625 \times 22f}{448 + t}$. Compounding this expression with that of the latent heat of vapour at t which is $1168 - t$ (being 956 at 212°);—we have as above the quantity of heat necessary for the vapour of saturation at $t = \frac{\overline{1168 - t} \times 22f'}{448 + t}$. The author has steered clear of what he considers the disputed points, of the *capacity* of air and vapour for heat: but it may be reasonably doubted whether the assumption of the equality of $l + t$ be a whit more tenable.

* In the portion of the curve marked "PRINSEP's experiments," both the uncorrected and the corrected observations are entered; the latter, distinguished by a dotted line passing through them, are alone to be attended to. The corrected places of the sulphuric acid experiments have been omitted, because they are necessarily doubtful. The *flexure* of GAY LUSSAC's curve seems to be the most suitable to experiment, were its ordinates a little increased.

Depressions of Wet-bulb Thermometer in dry air.



Tab. III.—*Comparison of various formulæ for the depression of the wet-bulb thermometer in a current of dry air, with the results of experiment.*

Temperature of the current of dry air.	Temperature of the wet-bulb therm.	Observed depression.	Observer's name.	Calculated depression for Bar. 30 inches.							
				Leslie's formula $D = 96\,f'$.	Gay Lussac's form. $D = \frac{2247\,f'}{30 - f'}$	Prinsep's formula $D = .0112t^{1.275}$.	Herbert's formula $D^{1.233} = 156.8f'$ (nearly.)	Hudson's formula $D = 98\,f'$ (nearly.)	Apjohn's formula $D = 87\,f'$	Formula adopted for tables $D = 84\,f'$.	Error of ditto from observation.
t	t'	D		D	D	D	D	D	D	D	
°	°										
30	20.8	9.2	G.	11.7	9.2	8.6	11.0	..	10.8	10.6	
40	27.3	12.7	G.	14.9	13.1	12.4	13.5	..	14.0	13.6	
50	33.9	16.1	G.	18.6	16.4	16.4	16.7	..	17.6	17.1	+0.1
	33.0	17.0	A.								
60	40.1	19.9	G.	22.9	20.6	20.7	20.0	23.4	21.8	21.3	—0.3
	38.4	21.6	A.								
70	46.0	23.7	G.	27.6	24.9	25.2	24.0	28.1	26.4	25.9	+0.2
	44.9	25.7	P.								
80	..	30.6	P.	32.7	29.7	29.9	28.4	33.2	31.3	30.8	+0.2
90	..	35.5	P.	38.2	34.6	34.7	33.1	38.4	36.5	36.0	+0.5
100	..	40.8	P.	44.0	40.0	39.7	38.2	44.0	42.2	41.6	+0.8
110	..	47.8	S.	50.0	46.0	44.9	43.5	49.0	48.3	47.6	—0.2 ?
120	..	54.1	S.	56.4	52.0	50.2	49.2	56.0	54.5	53.9	—0.2 ?
130	..	60.9	S.	63.1	58.6	55.6	55.1	62.2	61.1	60.5	—0.4 ?
140	..	68.2	S.	70.0	65.5	61.0	61.3	..	68.0	67.3	—0.9 ?
150	..	74.8	C.	..	72.4	66.7	..	..	75.1	74.3	—0.5
160	..	81.3	H.	..	79.4	72.5	..	..	82.3	81.5	+0.2
170	80.0	90.0	P.	..	87.0	78.2	79.8	90.4	89.6	88.9	—0.1
180	80.4	99.6?	P.	..	94.6	84.2	..	..	97.2	96.5	—3.1 ?
190	85.0	105.0	P.	107.0	102.0	91.2	98.	102.0	105.0	104.3	—0.7
200	..	..	..	..	109.5	96.4	..	..	112.0	111.1	
210	..	..	..	..	..	102.4	..	..	120.0	118.	
?	145.0	..	P.	627.	625.	105.	308.	487.	567.	552.	

[The letters in column 4 denote, G. Gay Lussac ; A. Apjohn ; P. Prinsep ; S. experiments tried at Benares, by suspending the wet-bulb thermometer in a half filled bottle of sulphuric acid ; these have been augmented 10 per cent. on insertion :— C. and H. Carbonic acid and Hydrogen gas heated in the steam pipe.]

The last line may be looked upon, in some measure, as the test line of the various formulæ : for, the hot current of air from the furnace, we have seen, barely melted lead and boiled mercury ; its temperature, therefore, could not much exceed 660 Farh. Let us see what it would be according to the principal formulæ depending upon the aqueous tension at t', which, when $t' = 145°$ is 6.53 inches by Dalton.

Leslie's formula gives 6.53 × 96 + 145 = 772°
Gay Lussac's (retaining f') 6.53 × 95.7 + 145 = 770
(omitting —f' in divisor) 6.53 × 782 + 145 = 655
Hudson's formula gives 487 + 145 = 632
Apjohn's,. .... 6.53 × 87 + 145 = 702
Formula deduced from my expts. 6.53 × 84 + 145 = 697

Anderson's, Herbert's, and my former formulæ are too much at variance at this high point to be worthy of quotation. The rest agree remarkably well, and it does not materially signify, nor is it perhaps possible to certify which multiplier is to be preferred. Professor APJOHN's has the merit of coinciding precisely at the temperature of 190° with my steam experiment; but for the range of lower and more practical temperatures it is perhaps slightly in excess. The simpler expression of "one-eightieth of the depression = the aqueous tension at t''" would there be nearer the mark; and would be easier of application. From my own experiments I deduced a mean of $D = 84 f'$ with which I constructed the table at the conclusion of this paper, but I must in fairness acknowledge that its preference to Professor APJOHN's rule is nearly evanescent in practice.

§ 2.—*Value of depressions less than the maximum, in centesimal hygrometric tension.*

We are now arrived at the second subject of inquiry, which is in fact of more practical importance than the first, since it includes every observation that can be made in an atmosphere never reduced to a state of absolute siccity.

The simplest condition of the case of *intermediate depressions* would be that assumed by Dr. HUDSON, viz., that the maximum depression being divided into 100 parts, each part should indicate one hundredth of the moisture of saturation at the given temperature, or $D : d :: f' : f' - f''$.

But such a law is not found to prevail in reality: nor is it analogous to the course of nature that it should exist in the case of the wet-bulb thermometer, when the hair-hygrometer and the law of evaporation require different ratios. It is more consonant with theory*, as it proves to be with practice, that the tendency to evaporation, and the cold consequent upon it, should increase in a geometrical ratio to the dryness of the air.

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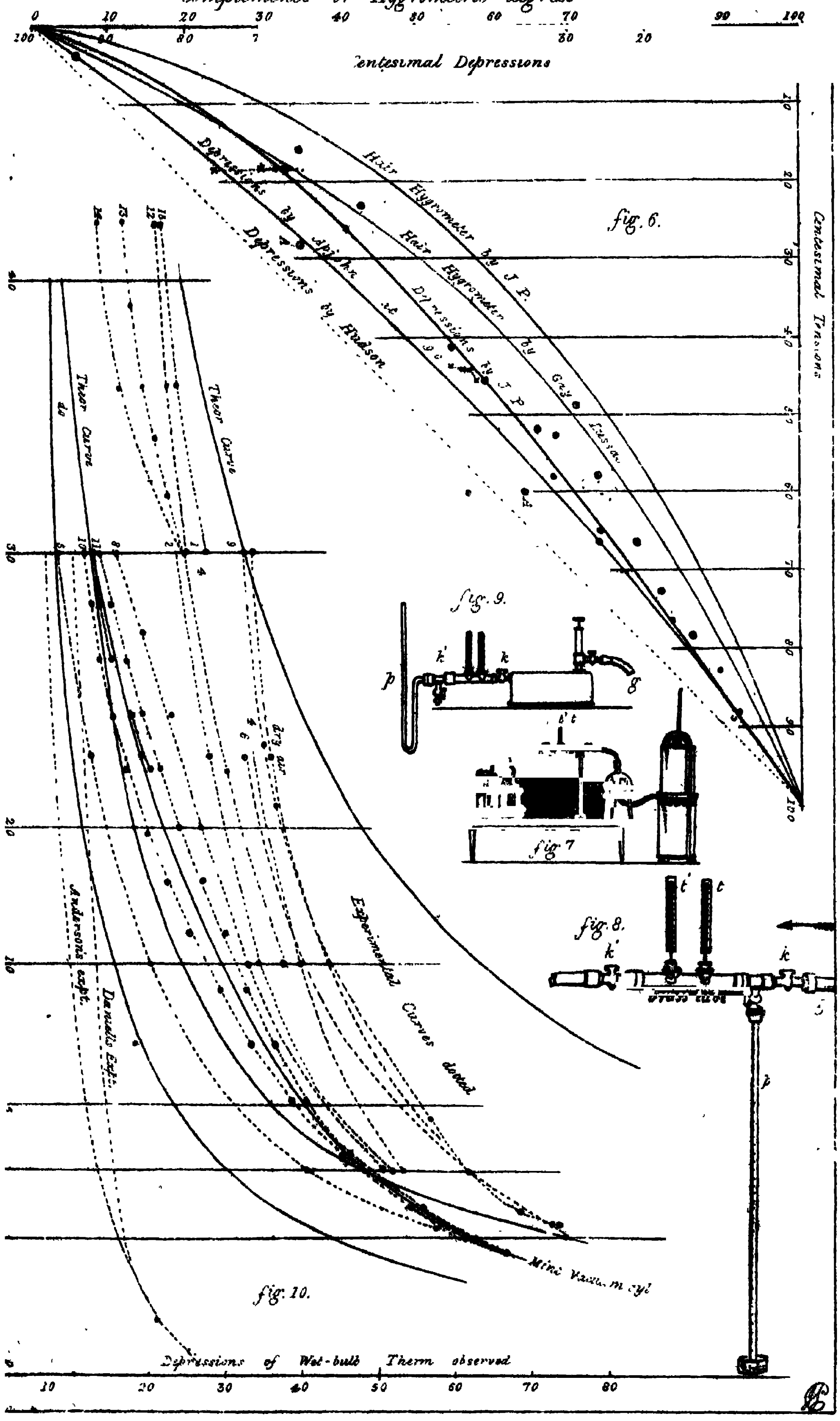
* The depressions will, *ceteris paribus*, be less, the more aqueous vapour is previously contained in the air, because the specific heat of a given volume of vapour being .529 (or .847 × .625) while that of air is .267, the specific heat of any mixture of the two must exceed that of air alone. But the curvature imparted to the line of depressions from this cause may easily be shewn to be trifling. Thus at the temperature of 80° where $f = 1.00$ inch; the capacity of dry air being c, that of moistened air will be $\frac{c \times \overline{p - f''} + c' \times f''}{p}$; whence, calling $c = 1$, for saturated air we should have the specific heat 1.053; and for half-saturated air, 1.031; and the depressional degrees at those points will be inversely so much less than those at the dry extremity of the curve. Were the other agents easily evaluated, we might through this means verify the specific heat of aqueous vapour.


Complements or Hygrometric degrees
0 10 20 30 40 50 60 70 90 100
100 90 80 70 30 20
Centesimal Depressions
Centesimal Tensions
10 20 30 40 50 60 70 80 90 100
Hair Hygrometer by J. P.
Hair Hygrometer by Gay Lussac
Depressions by J. P.
Depressions by Apjohn
Depressions by Hudson
fig. 6.
fig. 9.
p
k'
k
g
t' t
fig. 7
fig. 8.
t' t
k' k
p
fig. 10.
Theor Curve
Theor Curve
do
Experimental Curves dotted
Anderson's expt.
Daniell's Expt.
Mini Vacuum cyl
dry air
16 15 18 12
5 10 11 8 2 1 9 4
4 6
40 30 20 10
Depressions of Wet-bulb Therm observed
10 20 30 40 50 60 70 80

Before proceeding to detail the experiments directed to the elucidation of this point, it may be as well, as we have already become acquainted with the theoretical expressions of other authors for the *maximum*, to see how they also bear upon the *intermediate* depressions.

The formula of M. GAY LUSSAC makes no provision for aught but the maximum depression; but the omission may be readily supplied on the same simple principle as has been adopted by Professor APJOHN; namely, by the addition of $-f''$, the aqueous tension at the dew-point, to f': thus, by the latter author, in all cases $d = 87 f' - f''$.

At first sight, this would seem a simple arithmetical ratio, like Dr. HUDSON's, but inasmuch as the tensions *(f)* are themselves in geometrical ratio to the temperature *(t)*, the same parabolic curvature will extend to the centesimal depressions; or $f' - f''$ will follow some low power of $t - t'$.

Captain HERBERT's rule has the same happy introduction of f''. We have therefore but two theoretical enunciations to put to the test of comparison with experiment: for which purpose I will now bring forward such evidence as I have accumulated. In this branch of inquiry materials are so numerous in my registers kept at Benares and Calcutta, that it becomes expedient to gather selected data into groupes adapted to elucidate various points of the hygrometric scale. Moreover, as unity, or the maximum depression, varies in amount at each temperature, all observations must be brought to common centesimal terms before they can be compared in the manner which is best adapted to give a quick perception of the relation of such phenomena; namely, by a diagram, as in Pl. XXII. First, then, to enumerate the data afforded by method 5, or comparison with the dew-point, of which, in addition to my Benares observations, I have profited by the presence of an American ice-house on the banks of the Húghlí to collect an accurate series made thrice per diem in the hottest period of our Calcutta year.

TAB. IV.—*Comparison of intermediate Depressions with aqueous tensions, ascertained by the dew-point method, at Benares.*

Number of observations agreeing closely in their respective particulars.	Temp. of air. t °	Wet-bulb. t' °	Dew-point. t'' °	Centesimal tension. $f'' \div f$	Depression. $t - t'$ or, d	Complement cent. depn. $\frac{D-d}{D}$	Tabular centesim. tension deduced.	Error.
7 Obs. mean,	85.0	81.5	79.4	.83	3.5	89	.84	+01
12 Obs. ditto,	87.5	81.8	78.7	.76	5.7	83	.76	0
12 Obs ditto,	90.0	80.5	75.7	.65	9.5	74	.64	—01
6 Obs. ditto,	94.0	81.0	73.2	.52	13.0	66	.54	+02
6 Obs. ditto,	92.5	75.5	64.5	.41	17.0	55	.40	+01
13 Obs. ditto,	88.2	67.3	42.9	.23	20.9	43	.26	+03
8 Obs. ditto,	92.6	68.3	36.4	.16	21.3	35	.20	+04

Second series, from observations in Calcutta.

	t	t'	t''	$f'\div f$	d	$\frac{D-d}{d}$	*Tab.*	*Err.*
6 Obs. open air,	82.1	79.4	78.1	.88	2.7	92	.88	0
6 Obs. ditto,	84.6	79.9	76.7	.78	4.7	86	.80	+02
9 Obs. ditto,	85.6	79.7	75.5	.73	5.9	82	.75	+02
15 Obs. ditto,	87.7	80.2	74.6	.66	7.5	79	.70	+04
2 Obs. ditto,	96.0	85.6	78.3	.58	10.4	74	.64	+06
3 Obs. ditto,	93.8	82.9	71.2	.49	10.9	71	.60	+11 ?
4 Obs. ditto,	87.3	76.4	67.3	.53	10.9	68	.58	+05
3 Obs. ditto,	97.1	80.8	71.8	.45	16.3	59	.45	0
6 Obs. ditto,	97.3	73.6	55.5	.26	23.7	41	.26	0
1 Steam pipe,	19.0	92.5	74.3	.04	97.5	6	.04	0
3 Vacuum-pipe	92.8	80.8	74.8	.58	12.0	68	.57	—01

Third series, extracted from other observations.

	t	t'	t''	$f'\div f$	d	$\frac{D-d}{d}$	*Tab.*	*Err.*
7 Obs. by *Herbert* on river Ganges,	91.4	82.1	78.1	.66	9.3	74	.65	—01
6 Obs. by *Apjohn*,	70.0	60.8	54.5	.60	9.2	64	.52	-08
4 Obs. *ditto*, (heated air,)	93.2	69.0	53.7	.28	24.2	35	.22	—06

In the following series the air was dried to two fixed points of hygrometric tension by means of sulphuric acid, of which the drying power was known beforehand by the table which I published, from careful experiment, in my note on the hair hygrometer before alluded to; but I preferred verifying those determinations by fresh measurement of its barometric tension, in the mode I had adopted to correct the tables of aqueous tension during the past year; namely, by moistening a barometer tube with the acid solution, and mounting it in the ordinary manner. The daily readings registered in my monthly tables for May-June afforded a more accurate average than a cursory trial could have yielded; but the result was in perfect accordance with my former determination*.

Fourth series—current of air partially dried.

Number of observations in similar circumstances.	Temp. of air. t	Wet-bulb. t'	Known cent. tension.	Hair Hygrom.	Depression. $t-t'$ or, D	Complement cent. dep. $\frac{D-d}{D}$	Tabular centes. tension.	Error.
2 Obs. with gasometer current, Sulph. acid, 1.344, ...	° 90.2	° 75.3	.45	75	° 14.9	58	.45	0
2 Obs. ditto, ...	87.2	72.1	.44	74	15.1	56	.43	—01
2 Obs. ditto, ...	90.3	74.4	.44	74	15.9	56	.43	—01
1 Obs. ditto, ...	96.4	79.4	.44	74	17.0	57	.44	0
1 Obs. ditto, ...	94.0	76.6	.43	73	17.4	54	.40	—03
2 Obs. sulph. acid, 1.48, ...	88.8	65.2	.18	43	23.6	33	.20	+02
1 Obs. ditto, ...	87.7	61.1	.18	43	26.6	24 ?	.12	—06
1 Obs. shorter tube,	84.4	62.0	.18	43	22.4	32	.18	0
2 Obs. brass tube,..	87.8	64.3	.18	42	23.5	30	.17	—01

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* **It will be seen by the Meteorological Register for May 1836, that pure sulphuric acid caused the barometric column to be higher even than a boiled tube. This must be attributed to capillarity, which is negative with mercury, but acts in an opposite sense with acid or water. No allowance is made for capillarity in my registers.**

On inspection of the columns of complementry centesimal depression and centesimal tension in all the foregoing tables, the constant excess of the former is their first predominate feature; whence the certain conclusion that the ratio is not *direct*. But to arrive quicker at a conclusion of what it may be, let us view the position of the whole series in diagram 6, Pl. XXII. Here the base line designates the hygrometric tensions $f'' \div f$ and the ordinates denote the corresponding centesimal depressions $\overline{D-d} \div D$. If amid such a straggling and scattered nebula it be allowable to trace a normal line, the curve D *d* will have a preference over any other. Pursuing its dubious course, it passes through the two principal test groupes, upon which more dependence ought to be placed than upon isolated comparisons with the dew-point in still air. Now this line D *d* nearly coincides with the curve I suggested in 1829, from my Benares experiments, making H (or $f'' \div f$) follow the ratio of $\overline{D-d}^{1.5}$; or, calling D = 100, $H = \frac{\overline{D-d}^{1.5}}{100}$; in other words, the *centesimal tension* is as the difference of the actual and the maximum depression raised to the 1.5th power; a form obviously very convenient to be worked by logarithms. This formula has been used for constructing my general table ; and its errors may be judged of by the last two columns of the preceding experiments : but it need by no means supersede the elegant formula $d = 87\, f' - f''$ when the table is not at hand. The curve corresponding to the latter formula at 90° is also entered in fig. 6. At lower temperature it will have less flexure.

On the same diagram I have traced the curve of the hair-hygrometer indications, both according to GAY LUSSAC's data and those of my original plate in BRANDE's Journal, on purpose to shew that the *depression curve* passes between the two near the summit :—it was hence I derived the rule for correction of the rough maximum depressions, (Table I. II.) by taking it in the direct ratio of the hair-hygrometer indications : and the near accordance of the maxima so deduced, with the observed maxima in dry air, is an additional testimony in favor of the assumed parabolic curve.

It seems an unmerciful increase of the tax upon my reader's patience to extend this train of comparison further : yet it would be hardly fair to omit any thing that can tend to elucidate the subject or assist future investigation : I will not, therefore, forego, through a false and unphilosophical delicacy, the insertion of an abstract I had prepared for my own satisfaction, of three years' comparative deductions from the wet-bulb and hair-hygrometer. It detracts somewhat from its value, that a constant index error of 4 degrees has to be substracted from the readings of the hair-hygrometer during the period in question. This I only discovered on checking all the instruments, as is my custom, before commencing the present experiments; but the hygrometer has been untouched during the interval, and as its scale embraces the 100 degrees with as much sensibility as when it was constructed in 1825, there can be no hesitation in making the required correction throughout. The extreme points of this instrument should indeed be verified at least once in a year; as the index point is, from its delicate construction, easily shifted 2 or 3 degrees.

Tab. V.—*Comparison of the monthly averages of the Wet-bulb depression, and the Hair-hygrometer, for 3 years in Calcutta.*

	At 10 A. M.			Tension,		At 4 P. M.			Tension,	
	Temp.	Dep.	Hyg.	by Dep.	by Hyg.	Temp.	Dep.	Hyg.	by Dep.	by Hyg
	°					°				
Jan. 1833	68.0	8.4	81	.55	.61	72.4	11.6	74	.47	.49
1834	67.5	6.4	83	.64	.64	71.1	9.2	76	.53	.52
1835	67.8	8.0	80	.56	.59	70.7	11.5	70	.42	.43
Feb... 1	74.0	8.2	82	.60	.63	78.7	12.7	74	.44	.49
2	74.0	7.3	86	.64	.70	77.8	11.6	77	.48	.54
3	74.3	6.0	87	.70	.72	76.6	10.2	76	.52	.52
Mar... 1	83.5	9.8	81	.59	.59	89.2	17.3	66	.37	.43
2	82.3	7.5	86	.67	.68	86.7	12.2	76	.52	.52
3	79.8	8.3	85	.63	.66	83.6	13.0	70	.47	.44
April, 1	87.5	6.2	88	.75	.74	91.6	10.8	79	.60	.57
2	86.5	8.8	84	.65	.67	93.2	13.8	75	.52	.51
3	84.6	7.6	86	.68	.70	88.1	12.7	75	.52	.51
May, . 1	87.5	6.1	91	.75	.80	90.0	8.2	86	.67	.70
2	90.7	7.9	86	.69	.70	94.6	10.9	80	.58	.59
3	86.8	6.5	89	.74	.76	88.3	7.5	86	.79	,70
June, . 1	90.5	6.4	88	.75	.74	92.8	8.1	82	.70	.66
2	87.0	4.8	91	.80	.80	87.8	6.1	90	.75	.78
3	86.1	5.6	87	.76	.72	87.4	6.9	85	.72	.68
July, . 1	86.3	4.0	91	.83	.80	87.9	4.6	90	.83	.78
2	86.6	5.1	91	.80	.80	88.0	6.0	90	.76	.78
3	82.7	4.0	88	.77	.74	85.3	4.8	88	.80	.74
Aug... 1	85.0	4.1	92	.82	.82	86.8	4.9	89	.75	.76
2	85.1	4.2	92	.82	.82	86.7	5.3	91	.78	.80
3	84.0	4.0	92	,82	.82	85.0	4.3	91	.81	.80
Sept.. 1	86.3	4.4	91	.76	.80	88.3	5.5	88	.82	.74
2	85.9	4.9	92	.75	.82	86.4	5.9	91	.76	.80
3	83.7	4.8	91	.80	.80	85.0	6.8	89	.71	.76
Oct... 1	85.2	5.6	87	.76	.72	86.8	7.6	83	.69	.65
2	82 9	4.0	83	.82	.84	83.9	5.0	91	.79	.80
3	83.3	6.8	87	.71	.72	85.1	9.3	82	.61	.63
Nov.. 1	79.	6.9	84	.69	.66	82.1	10.1	77	.57	.54
2	79.2	7.5	85	.66	.68	79.4	10.1	78	.55	.56
3	75.6	7.7	85	.64	.68	77.9	10.0	79	.55	.57
Dec.. 1	71.7	5.8	85	.70	.68	74.3	7.2	82	.65	.63
2	72.4	6.1	87	.67	.72	75.7	9.0	81	.57	.61
3	69.8	6.1	84	.68	.66	72.0	8.9	78	.55	.56
Means,	81.2	6.1	86.8	.71	.72	83.8	8.9	81.5	.63	.63

The actual tension of vapour in inches, found by multiplying Dalton's maximun tension of vapour at *t* by the percentage here given, is, at 81°. 2= 1.040 × .71 = .738; at 83°.8=1.128 ×.63=.711 (or .716 at 81°.2) being at the two periods of the day, on an average, very nearly equal; though, relatively, the air is much drier in the afternoon.

A similar comparison to that afforded by the above table would have been published with my journals for 1825-6 in the Philosophical Transactions for 1827, had the registers been allowed to stand as they were; but the columns of aqueous tension were struck out, although from the elaborate care I had taken in valuing the degrees of my hair hygrometer they were entitled to some reliance. It is, however, not worth while to republish them, as the wet-bulb instrument was then situated outside and the hair hygrometer inside the house[*], and the two columns are not strictly comparable. One little table, however, deduced from four years' daily experiments at Benares, which was also suppressed at home, I think likely to prove useful, while it bears directly on the wet-bulb theory, and exemplifies the truth of the assumption of its immediate dependence on f'. This table shews the actual evaporation in depth per month, as measured by a small evaporameter suspended in the open air, for the opposite extremes of the year. The instrument is described in the fifteenth volume of the *Asiatic Researches*. I have collected on the left hand the observed quantities, and have now inserted on the right the theoretical numbers which should express the ratio of evaporation. The results are even more satisfactory than could have been anticipated; and lead to the following very simple rule to find the amount of evaporation roughly in inches per diem. "Multiply the aqueous tension at the wet-bulb temperature by the observed depression in degrees, and divide by 34." Omitting the latter operation, the product will express in round terms the evaporation per month in the open air, or in a moderate breeze.

TAB. VI.—*Rate of Evaporation and simultaneous depression observed at Benares.*

Months.	Year.	Temp. of air. t. °	Wet-bulb. t' °	Depression. d °	Obsvd. Evaporation per month inches.	Ditto per diem inch.	sion, f'	Depression × tension, $d \times f'$.	Calculated daily evaporation, $\frac{d \times f'}{34}$
April and May,	1823	88.0	68.9	19.1	13.9				
	1824	93.1	71.8	21.3	11.9				
	1825	92.3	74.2	18.1	14.7				
	1826	90.4	69.8	20.7	15.1				
	Means	91.2	70.9	20.3	13.9	0.463	0.748	15.18	0.447
March,	1823	79.8	62.0	17.8	8.7				
	1824	81.4	66.5	13.8	6.7				
	1825	75.1	64.7	11.4	4.0				
	1826	80.8	63.4	16.4	9.8				
	Means	79.4	64.1	15.3	7.3	0.243	0.599	8.16	0.240

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[*] The Calcutta Oriental Magazine, 1827, contains the whole paper.

							f'	$d \times f'$	$d \times f'$
July and August,	1823	80.5	78.2	2.3	2.3				
	1824	85.6	82.1	3.5	2.6				
	1825	86.9	81.3	4.6	4.4				
	1826	84.4	80.8	3.6	3.6				
	Means	84.4	80.6	3.8	3.2	0.107	1.020	3.88	0.114
December and January,	1823	60.1	55.7	4.4	2.3				
	1824	61.8	56.6	5.2	4.0				
	1825	63.5	58.3	5.2	5.6				
	1826	63.8	54.9	8.9	3.1				
	Means	62.3	56.3	6.0	2.5	0.085	0.462	2.77	0.081
					per. an.				
The whole twelve months,	1823	76.4	68.1	8.3	65.6				
	1824	80.0	71.2	8.8	60.5				
	1825	80.0	71.1	8.9	67.1				
	Means	78.9	70.1	8.7	64.4	0.179	0.729	6.34	0.186
				permonth	5.37				

I have, as yet, had no opportunity of applying the principle ascertained from this table, to the circumstances of other places*.

§ 3.—*Influence of the Barometer on the Wet-bulb depression.*

All philosophers agree in rating the influence of atmospheric pressure on depression as inversely proportional to the height of the barometer; so that when the depression under a pressure of 30 inches is known, it may immediately found for any other pressure by multiplying d into $\frac{30}{p}$, p being the observed height of the barometer.

That the evaporation increases with diminution of pressure nearly in the above ratio, has been proved by various experiments; and it might confidently be anticipated, from the necessary connection between the evaporation and the refrigeration, (as exemplified in the concluding table of my last section,) that the same law would prevail in the depressions: but the only two experiments directed to this point that I am acquainted with, lead to an opposite conclusion. These were cited in my former paper: but as they are not accessible to many readers, I will here repeat them. Mr. DANIELL's experiment will be found in Jour. Roy. Inst. XVII., and Mr. ANDERSON's in BREWSTER's Cyclopedia, Art. Hygrometry.

Barometric pressure.	Ratio.	Evaporation in grains by Daniell.	Depression of wet-bulb by Daniell.	Increment.	Depression of wet-bulb by Anderson.	Increment.
30.4	1	1.24	9	0	5	0
15.2	$\frac{1}{2}$	2.97	12	+3	9	+4
7.6	$\frac{1}{4}$	5.68	15	+3	13	+4
3.8	$\frac{1}{8}$	9·12	18	+3	18	+5
1.9	$\frac{1}{16}$	15.92	21	+3		
.9	$\frac{1}{32}$	29.33	24.5	+3.5		
.5	$\frac{1}{64}$	50.74	26	+1.6		

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* The tables now published by the astronomer at Madras will afford good data; but his mode of measurement must be first known, as his evaporations seem double of my own.

Now in these instances the evaporation certainly followed the inverse pressure law; but the depression was made to receive only a constant arithmetical increment for each geometrical decrement of the pressure; in accordance with which I assumed that the proper correction for variation of pressure should be $d\sqrt{\frac{30}{p}}$ rather than $d\frac{30}{p}$; and even this would require a different co-efficient to make it suit the two cases quoted above. Under such an uncertainty as to the real amount of this important correction, I was induced to direct a fresh series of experiments to this particular object; and as my results differ greatly from what has preceded, it is incumbent on me to describe my process a little in detail.

I first prescribed to myself the necessity of working with a current of air as similar as might be to that of the maximum series, as without such a precaution it would be impossible to ensure the permanent hygrometric status of the air in contact with the wet-bulb. The bell glass of an air-pump, under which I imagine the experiments of DANIELL and ANDERSON to have been conducted, could not possibly fulfil this indispensable condition, since a partial halo of moisture would encircle the bulb of their thermometer;—nor do they appear to have used a hair hygrometer to inform them how far this might be the case. Mr. DANIELL it is true had a dew-point instrument fitted into the side of the glass receiver, but for slight aqueous tension this instrument becomes wholly useless. The extent to which his air was dried can be calculated pretty well from his own datum that the depression at 50° was nine degrees, which by my table would indicate centesimal tension ·30: or by APJOHN's formula $\frac{.263-(9\div 87)}{.357}=\cdot 42$ in the latter case requiring a cold of 8 degrees, and in the former of 16, below the freezing point to produce deposition.

But to return to my own experiments:—

In place of the short open glass tube connected with the gasometer and glass balloon in which the wet-bulb was before exposed to the current of air, (fig. 1,) a thin horizontal brass tube (fig. 7) was substituted, having two lateral apertures for the admission through corks, air-tight, of the dry and wet thermometer bulbs (t, t'). From the same brass tube descended a glass barometer tube (p) into a reservoir of mercury, similar to the gage of an air-pump, for marking the actual pressure close to the thermometers. The other end of the tube was conducted by a flexible pipe F to the receiver of an air-pump, where a continual vacuum could be kept up by pumping without intermission during the course of an experiment.

and by manœuvring the stopcocks *(k, k')* at the two ends of the brass tube, the pressure could be maintained at any point, and the draft of air regulated until the temperature of the wet-bulb had been satisfactorily ascertained.

Finding that the labour of working the pump was rather irksome in a climate of 95°, I afterwards availed myself of the vacuum engine of the coining-press room in the Mint to relieve me from this duty. In the pipe leading from the twelve recoil-pumps of the presses a vacuum of about (or rather 30—27) inches is constantly maintained by the steam engine, so that by adapting the tube F to this with a stopcock, I was enabled to regulate the pressure, and prolong each interval with the utmost ease and comfort.

It will be seen from the table of experiments below, that *by employing a current of dry air* the freezing point was readily attained under a pressure of 7½ inches, while the dry thermometer, only one inch from it, marked 92°: whereas all who have tried Leslie's process for freezing have found it exceedingly difficult in the hot weather of this country to produce ice with a vacuum nearly perfect. The reason has been already explained: in the latter case the partially moist atmosphere arrests the progress of refrigeration; whereas in the latter, the vapour rising from the evaporating surface is continually removed;—it is, in fact, like sitting under a punkah or without it, an illustration that requires no comment to an Indian reader! Of such influence is the motion of the air in the experiment, that, as will be seen presently, a cold *much below the freezing point* may be attained under a pressure of 4½ inches, *with common air at 92° containing six-tenths of its vapour of saturation* (dew-point = 75°) and without the aid of sulphuric acid, or any other artificial means of previously drying it! This unexpected result opens a wide field for speculation as to the possibility of modifying the apparatus of Leslie for the artificial production of ice; and I hope, when leisure permits, to resume the thread of this collateral and highly interesting discovery. The nature of the problem teaches us *à priori*, that if a temperature of 20° can be attained under a pressure of 4½ inches, the cold at two inches ought to be many degrees below zero of Fahrenheit's scale!

Out of four experiments made with the air-pump, and eight with the Mint vacuum engine, it will be sufficient, after quoting the numerical results of the whole, and referring to the accompanying diagram (Pl. XXII. fig. 10.) for a comprehensive view of their general bearing, to select two or three of the most regular examples for analytical discussion.

TAB. VII.—*Depressions under diminished pressure.*

	Temp. of air.	Hyg. tens.	Temp. of wet-bulb, under a pressure of 30.	22.5	15.	7.5	6.0	5.5	5.0 in.
	°		°		°	°			
1. Expt. with air pump, air dried by Sul. Ac. 1.48,	84.0	.18	61.0	..	56.0	48.			
2. Ditto, corks fitted closer.	84.7	.18	..	..	51.0	..			
3. Brass tube, better fitted,	84.4	.18	62.0	57.0	50.3	32.0			
4. Ditto, careful expt...	87.8	.18	64.3	55.0	49.0	35.0			
5. Common air, in Mint vac. tube; dew-point 79°.5,	88.5	.75	81.3	76.4	69.0	48.0	..	32.0	
6. Partially dried, hair-hyg. in balloon av. 34, ..	92.1	.12	64.?	60.1	52.9	31.0	24.0	20.0	18.0
7. Nearly dry air; hyg. 1°,..	91.0	.00	58.3	54.4	48.7	30.0	20.4	18.5	
7½. Partly dried; hyg. 12? ..	91.0	.03 ?	..	65.	53.9	..	25.7	20.0	
8. Hygrom. variable, av. 20..	93.2	.05	79.1	75.1	59.(	..	..	..	
9. Dry air; hyg. 2°, ..	92.0	.01	59.5	63.2	56.3	38.5	..	26.4	20.0

The last experiment is evidently affected with some accidental error, since the depression is *less* at 22.5 inches than at 30. I imagine the external air was admitted through an unobserved leakage of the tube, or a drop of water may have fallen in the tube, and thus moistened the air before it reached the wet-bulb.

I now detached the gasometer and balloon, and admitted the air of the room directly into the tube at stopcock *k* (fig. 8) keeping up a prolonged current at intervals of every two inches of pressure from 30.0 upwards to 5 inches, and then descending in the same manner: taking care to wet the thermometer from time to time as its water evaporated. In ascending the scale I regulated the pressures in the barometer-gage principally by manœuvring the stopcock (*k'*) next to the vacuum pipe, the orifice at *k* remaining constant: whereas in descending, I allowed *k'* to remain untouched while I brought the gage to the desired point by gradually opening the outer stopcock *k*.

The effect of this will be understood on viewing the apparatus: the current of air was considerably stronger in the last case than in the first, and in consequence the depressions are somewhat greater. To this it must be added, that in the ascending scale the depressions will tend to lag below their full amount, while in descending they will err in an opposite sense; all of which is well exhibited in dotted curves numbered 10, 11 of diagram 10. The mean of the two series (marked by a plain line on the diagram) may be assumed as a good foundation for the analysis we have proposed.

Experiments 10 *and* 11, *on depressions under diminished pressure.*

Temperature of the room 92°.2 ; dew-point 74°.8 = centesimal tension .58
Hair-hygrometer, 79 = ditto .57

Barom. pressure inches.	*Ascending series.* Temp of air.	Wet-bulb. 1	Wet-bulb. 2		*Descendi* Wet bulb. 3	Wet-bulb. 4	Temp. of air.	Depression ascending.	Depression descending	Mean depression observed.
	°	°	°		°					
30	92.7	80.4	82.0	rewetted)	80.5		93.0	11.7	13.0	12 0
28		79.7	80.8		79.2			12.6	14.3	13.1
26	92.9	78.0	80.0	rewetted	76.8	79.2		13.9	15.5	14.6
24			77.8		74.7	75.2		15.0	18.0	17.0
22	92.7		75.4	(rewetted	72.4	73.8		16.4	20.4	19.1
20			73.0			70.2		19.8	23.3	21.5
18			70.3			66.9		22.5	26.6	24.5
16			67.7			64.2		24.2	29.3	26.8
14	93.0		64.0			61.2		29.	32.3	30.6
12			60.0			57.4		33.	36.1	34.5
10			54.9	(rewetted	54.6	53.8	93.2	38.1	39.7	38.9
8			48.3		47.3		93.2	44.7	45.9	45.3
6			38.0		38.8		92.5	55.0	53.7	53.1
5			31.0		30.8		91.6	62.0	60.8	61.4
4.4				rewetted	23.7		89.8		66.1	66.1

At the first glance towards the final columns of this table, one might at first be led to exclaim, upon the wonderful accordance between theory and fact! The ascending series, especially, agrees exactly with the calculation in several points, and does not diverge materially until the pressure falls to six inches, far beyond the reach of any likely contingency within our observance.

But all this seemingly agreeable coincidence is, in a measure, delusory. The effect is compounded of two different influences—1, the rarefaction; and 2, the diminution of humidity which is consequent thereon. We know from our second section of experiments how to appreciate this latter disturbing cause, and so isolate the reduction of temperature due to the diminished pressure alone; but the prior experiments give us an opportunity of estimating it in a more direct manner. Thus, taking experiment 7, we have the following data: the temperature being 91°. Fahrenheit. The fourth column contains the hypothetical depressions on the supposition of the inverse-pressure ratio.

Barometrical pressure inches.	Depression in dry air. D	Increment observed. D—d	Theoretical depression. $d \times \frac{30}{p}$	Increment $d + \frac{30}{p} - d$	Calculated co-efficient.
	°	Δ		δ	$\Delta \div \delta$
30.0	32.7		32.7		
27.5	35.6	+ 2.9	43.6	+ 10.9	.27
15.0	42.3	+ 9.6	65.4	+ 32.7	.29
7.5	61.0	+ 28.3	130.8	+ 98.1	.29
6.0	70.8	+ 30.1	165.5	+ 132.8	.23
5.5	72.1	+ 39.4	176.5	+ 143.8	.27
5.4	72.8	+ 40.1	179.8	+ 147.1	.27

The rate of increment observed, it will be remarked, here invariably falls short of the calculated rate in the fifth column, but it bears always the same proportion to it, about one-third; as shewn in the sixth column: therefore in this example the law of the inverse pressures holds good relatively, but it requires a co-efficient to reduce the absolute amount. Thus, the maximum depression in dry air at any pressure will, by the experiment, be equal to $d + .27\left(d\frac{30}{p} - d\right)$ instead of $d + \left(d\frac{30}{p} - d\right)$ (or simply $d\frac{30}{p}$). I will not seek to enquire the cause of this deviation from theory; or whether it be peculiar to the form of apparatus I employed; or whether the effect will be constant under all circumstances:—I will merely suggest that the supply of heat from extraneous sources—the brass tube (only half inch diam.) radiation, &c. could not fail to reduce the cooling effect of the mere current of air; and here we have the measure of their united disturbing power, which it is satisfactory to find constant throughout.

Let us now see whether the same constancy can be traced in the more elaborate experiment with common air (10-11.) The first thing necessary is to calculate the percentage of moisture for each step. Now, as under 30 inches the centesimal tension was found to be ·58 by the dew-point, and as no source of fresh supply was at hand, the tension at any other pressure should be directly as the pressure, or inversely as the volume; since it is evident that a double space, for instance, will require twice as much aqueous vapour to bring it to a given state of humidity; the aqueous tension, therefore, will be $·58 \times \frac{p}{30}$ for this series of experiments. Again, from our table of depressions, (from the diagram or from the formula) can be obtained, with the reading at these variable states of humidity, the depression either in dry air or in air of the initial tension ·58. I have, in fact, given both in the following table, and have set in the three last columns the calculated depressions by the expression just found of $d + .27\left(\frac{d\,30}{p} - d\right)$.

Tab. VIII.—*Experiment* 10-11, *reduced to a constant hygrometric state.*

Barometer.	Centes. aqueous tension calc. $H \times \frac{p}{30}$	Tabular centesimal depression corresponding T	Observed depression variable aq. tens. d	Deduced depression for aq. ten. .58 $d \times \frac{32}{T}$	Deduced depression for dry air, $D = d \times \frac{100}{T}$	Calculated depression for variable aq. tens. of second column.	Calculated depression for aq. tens. .58	Calculated depression for dry air.
			°	°	°	°	°	°
30	.58	32	12.0	12.0	37.5	12.	12.0	37.5
28	.54	34	13.1	12.2	38.2	13.1	12.3	38.2
26	.50	37	14.6	12.5	39.0	14.5	12.6	39.1
24	.46	42	17.0	12.8	40.1	17.0	12.8	40.1
22	.42	44	19.1	13.8	43.3	18.2	13.3	41.4
20	.39	47	21.5	14.7	46.0	20.1	13.7	42.8
18	.35	50	24.5	15.7	49.0	22.3	14.3	44.6
16	.31	54	26.8	15.9	49.8	25.6	15.0	47.4
14	.27	58	30.6	16.9	52.7	28.8	15.9	49.7
12	.23	62	34.5	17.8	55.5	33.2	17.1	53.5
10	.19	66	38.9	18.6	58.2	39.2	18.7	58.9
8	.15	72	45.3	20.2	63.3	49.4	19.4	69.6
6	.11	76	53.1	22.3	69.8	63.0	25.7	80.4
5	.096	78	61.4	25.1	78.5	71.0	29.1	91.0
4.4	.085	79	66.1	26.7	83.5	78.0	34.8	99.6

With exception of the four lowermost entries, the three middle (or observed) columns of this table accord wonderfully well with the three last, which are calculated by the formula above given multiplied into T, (the tabular cent. dep.); which is variable in the first of them, (that of the experiments;) is equal to ·32 for the case of humidity ·58; and is of course = 0 for the final case, of extreme dryness. Were we to suppose that the dryness of the air did not mount higher than ·18 (second column) from some unperceived cause, the calculated depressions would suit equally well from beginning to end; and it must be remembered that any disturbing force will be much more felt in the low pressures. Moreover, it can hardly be expected that the depression should continue to follow the same law, after the evaporating surface has congealed into ice. Had the ascending series of depressions only been used, instead of the mean, the accordance would have been greater towards the middle of the scale.

It is hardly necessary to analyse any more of the present series, after ascertaining that the same co-efficient is equally applicable to dry and wet air. We may therefore proceed at once to the conclusion, that *the depression of the wet-bulb thermometer, ceteris paribus, varies inversely as the barometric pressure, the actual variation being for every case twenty-seven hundredths of the calculated variation.*

§ 4.—*Depressions under augmented barometric pressure.*

It would perhaps have been better to have preceded the last enunciation, by a description of the experiments included under this head, since they obviously form part of the same series, and must be governed by the same law. They need not detain us many minutes.

The modification of apparatus now employed is depicted in fig. 9. Between the gasometer and the brass tube furnished with the two thermometers was introduced a condensed air blow-pipe; while at the other extremity near the discharge cock *k'*, was adapted a syphon barometer capable of shewing an increase of pressure up to + 12 inches. By keeping up the action of the pump with the discharge cock more or less open, a current of condensed air could be maintained at any pressure until the readings of the wet-bulb became stationary; for, as before stated, it was upon the current only that reliance could be placed; and my endeavour was always to maintain the same rapidity in the passage of the air, although small variations in this particular do not, and ought not, to produce any sensible error.

Not having used a hygrometer in this series, I trust to the depression itself (at 30 inches) to supply the datum of the humidity; and here of course, under condensation, the moisture *increases* directly with the pressure. On the diagram this is very conspicuous in figs. 13, 14; and as the air approaches dryness, the line formed will be seen amalgamating with the curvature of the former experiments.

TAB. IX.—*Depressions under increased pressure.*

Barom. pressure. inches.	First Experiment.			Second Experiment.			Third Experiment.			Fourth experiment.		
	Temp. air.	Depression.	Humidity.	Temp. air.	Depression.	Humidity.	Temp. air.	Depression.	Humidity.	Temp. air.	Depression.	Humidity.
	°	°		°	°		°	°				
30	93.5	23.5	.24	93.5	23.7	.24	85.0	24.0	.15	86.4	26.8	.10
33		—		93.6	20.9	.26						
36		21.5	.29	93.8	17.8	.29		14.0	.18		22.8	.12
42		19.5	.34	94.3	15.5	.34	85.2	11.4	.21		20.7	.14

In the last experiment the air was maintained for a long time at each pressure, whence its results are perhaps entitled to greater confidence than the rest. The direct theoretical depressions, $d \times \frac{30}{p}$ would be 26°.8, 22°.3, and 19°.1, which corrected by the co-efficient before found, would become 26°.8, 25°.6, and 24°.7; these again would have to be diminished for the altered humidity to 26.8, 24·5, and 22.8; still, however, differing materially from the experiment, which I attribute to the difficulty of keeping up a sufficient draft at the high pressures, in consequence of which the humidity is not fairly estimated.

If we examine the first experiment we shall have,

The direct geometrical depressions,	23.5	19.6	16.8
These modified by co-efficient, .27	23.5	22.4	21.7
Corrected to the incipient state of humidity will be,	23.5	20.0	18.1
The observed depressions being in this case,	23.5	21.5	19.5

nearly midway between the modified and the corrected numbers, and as much above the latter as they were below them in experiment 4,—so it will be not unreasonable to conclude that our formula would hold good for augmented depressions, if proper care were taken in conducting them.

We have now examined every case of depression that can be experienced in common air, and we may finally sum up this lengthy investigation by uniting the members of the formula, that it may comprehend both changes of humidity and changes of atmospheric pressure thus:—

$$d = 84 f' - f'' + .27\left(\frac{d\,30}{p} - d\right)$$

The latter member of the equation may be converted into a table of multipliers for heights of the barometer other than 30, which will leave the table I have appended to the present paper applicable to all circumstances that can occur. The rule for its use will be given in the proper place.

§ 5.—*Depression of wet-bulb in other gaseous media.*

It has been seen that the theory of the wet-bulb thermometer is entirely based on the relation of the specific heats, or capacities, of water, of vapour, and of air. It may be made therefore to furnish an unexceptionable and easy method of solving the much-contested question of the relative capacity of different gaseous fluids, by substituting any of the latter for common air in the experimental determination of the depression.

By GAY LUSSAC's formula we perceive that the depression varies precisely in the inverse ratio of the air's capacity, c (see p. 405.) APJOHN's formula is based on the same datum; thus the specific heat of vapour at 50° being 1129 (= 967 + 212 — 50); that of water being 1; and that of air $c = 0.267$; " one part of air in cooling through d degrees will raise the temperature of 0.267 part water through the same number, and will consequently be adequate to vaporize a quantity of water represented by $\frac{.267\ d.}{1129}$". Now, as $\cdot 267\ d\ (= c\ d)$ is a constant quantity, any change in the value of c must affect d in an opposite or inverse sense, that is $c' = \frac{c\ d}{d'}$, d' being the depression observed in other medium than common air.

As most likely to exhibit any difference of specific heat, and without reference to any prior determination of the question, I selected two gases, *hydrogen* and *carbonic acid*, as far at variance in essential points as could be wished, and proceeded with them exactly as had been done with ordinary air. On account of the mode of preparing the two gases by distillation through a water-trough, they entered the gasometer surcharged with moisture: and, as noticed below, even after being well dried by the acid in the chamber, they took up moisture from the discharge-pipe on their passage to the wet-bulb. I could only approximatively remedy this evil by immediately filling in common air, and finding how much moisture the latter also absorbed in its passage. The error was of course less, if at all, perceptible at the high temperatures, and in a fresh series of experiments it was obviated by the introduction of my tell-tale hair hygrometer.

Wishing to save the gas, it was made to pass into another gasometer instead of into the open air; on which account the current both of hydrogen and of carbonic acid passed more slowly through the steam-heated tube than the air had done, and their temperature only rose to 160 and 170, in lieu of 180 and even 190 as at first. Here follow the readings which were considered as coincident, but, as before, there was difficulty in keeping the dry thermometer stationary,

TAB. X.—*Depressions with Hydrogen gas. First Series.*

	Therm. in air.	Wet-bulb.	Depression.	Hygrometer.	Tension centesimal.	Tabular depression in dry air.	Ratio. $d \div D$
	o	o	o				
1. Through steam pipe,	92.0	67.8	24.2	—	?	37.1	
2. Ditto, steam on, ..	160.0	83.2	76.8	—	nearly dry.	81.5	.94
3. Ditto, ditto, ...	137.0	76.4	60.6	—	ditto.	65.3	.93
4. Ditto, cold, ...	93.8	67.5	26.3	44 ?	.17 ?	38.1	

The hydrogen of the gasometer in the first two experiments was supposed to be dry, but it was found that it acquired moisture in passing through the pipes, which had been moistened by the distillation of the hydrogen ; the amount of error was estimated by filling common air in, and finding how much its depression differed from the full rate. The gas of 3, and 4 was passed out into a vessel containing the hair hygrometer ; but still no great confidence was placed in the series, and on two subsequent days fresh gas was prepared.

Second Series.

5. Protracted current of hydrogen gas,..	85.4	60.0	25.4	
6. Common air treated exactly in the same manner, ...	90.6	59.0	31.6	= 29.1 at 85·4
Ratio of	29°.1	to 25°.4	as	1.00 to .87

This was still unsatisfactory, as there was no mode of testing the hygrometric state of the gas : I now therefore fitted the glass chamber enclosing the hair hygrometer, (as in fig. 1) and took the following readings after intervals of a day each.

	t	t'	d	h	Calc. Maxim. in Hydrogen.	Depress. in Atm. air.	Ratio. $d \div D$
7. Hydrogen, current,	87.8	60.5	27.3	8	29.5	34.8	.84
8. Ditto, full draft, ..	88.0	59.7	28.3	5	29.8	34.9	.86
9. Ditto, ditto, ...	84.0	57.1	26.9	4	28.0	32.8	.85
10. Ditto, ditto, ...	88.5	58.5	30.0	4	31.2	35.2	.88
11. Common air.	87.0	54.8	32.2	4 ?	33.5	34.4	
12. Ditto, ...	83.1	52.1	32.0	2	32.6	32.4	

Still a fourth series was thought necessary ; and in this all access of moisture to the tubes being prevented by passing the gas over sulphuric acid before it entered the gasometer, and leaving it for a week to dry thoroughly, the hair hygrometer marked extreme siccity : precaution was also taken to cool the wet-bulb with ice below the depression point, before inserting it in the tube.

Fourth Series, Hydrogen gas.

	t	t'	d	h.	D	$d \div D$
13. Full draft,....	86.7	58.5	28.2	0	34.2	.82
14. Ditto, ...	85.0	57.4	27.6	0	33.4	.83
15. Ditto, ...	82.8	56.5	26.3	0	32.2	.81

This fourth series, on which every care was bestowed to ensure accuracy, confirming as it does the ratio of the prior experiments, certainly tends to prove that hydrogen produces a less depression than common air in the proportion of 82 to 100 ; and consequently that the specific heat of this gas for equal volumes should be 1.22, that of atmospheric air being 1.

Tab. XI.—*Depressions with Carbonic Acid.*

	Temp. air. *t*	Wet-bulb. *t'*	Depression. *d*	Hair hygr.	Tabular depression for dry air.	Ratio. $\frac{d}{D}$
	°	°	°		D	
1. Current through steam pipe, ..	91.7	66.2	25.5	(acquired moisture .20 ?)	36.3	?
2. Do. steam on,	161.0	85.0	76.0	Nearly dry ?	82.2	.94
3. Do. quicker draft,	160.0	81.5	78.5	ditto,	81.5	
4. Common air, ..	86.8	60.8	26.0		34.3	

The experiment with common air shews that the passages still imparted moisture to the amount of full ·12, and therefore vitiated the result as with hydrogen. The trial was renewed with the precaution of employing the hair hygrometer.

				h		*d*	D	*d* ÷ D
5. Short glass tube,	83.6	55.0	28.6	5	Corrected	30.1	32.6	.92
6. Ditto, ...	86.2	55.2	31.0	3	for dry	32.0	34.0	.94
7. Ditto, ...	83.7	53.6	30.0	3	air or	31.0	32.6	.95
8. Common air,....	88.2	54.5	33.7	3	max. dep.	34.8	35.0	

Here again the depression in carbonic acid gas is proved to be 94 hundredths of that in common air, whence the specific heat of this gas should turn out 1.06, air being 1.00. A third series was taken :

8. Well dried, ..	88.7	56.2	32.5	0	32.5	35.3	91
9. Ditto, ...	84.8	55.1	29.7	0.5	29.9	33.2	90
10. Ditto, ...	89.6	57.2	32.4	1	32.8	35.8	90

In the last three experiments which were made with the precautions I have described, in the hydrogen experiments, (13-15) a little of the latter gas was mixed ($\frac{1}{20}$th) with the carbonic acid ; while in experiments 6, 7, common air may have been present to the same extent. We may therefore assume the maximum depression in dry carbonic acid to be about 92 per cent. of that in atmospheric air; and its spec. heat = 1·087.

Although these unexpected results are supported by their great uniformity, I still feel hesitation in inviting for them the implicit confidence of chemists, in opposition to the very opposite conclusions of other experimenters. Had the specific heat of one gas proved in *defect* and the other in *excess*, it would have been more consonant with the analogy of their specific gravity,—but that two gases so strongly contrasted, should both err, on the same side, I own to be plausible evidence against me. Still I hardly think that the 8 per cent. discrepancy in the carbonic acid experiments is within the limits of experimental error ; and the 18 per cent. of the hydrogen is certainly more than I am willing to allow to be attributable to such a cause.

At any rate it must be conceded that the method itself possesses superior facility to the process of **De la Roche** and **Berard**[*], also followed by **Haycraft**[†], or to that more recently followed by my friends Messrs. F. **Marcet** and **De la Rive** of Geneva[‡].

It may be as well to recite the conflicting values arrived at by these and other authors, including M. **Dulong**[§], whose mode of investigation by the velocity of sonorous vibrations in the respective gases, was most ingenious in itself, and perhaps better entitled to respect than any other.

Tab. XII.—*Specific heat of gaseous bodies by volume, under constant pressure.*

	By De la Roche and Berard.	By Haycraft	By Marcet and De la Rive.	By DuLong.	By wet-bulb depression.
Atmospheric air,	1,000	1,000	1,000	1,000	1,000
Oxygen.	976	1,000	1,000	1,000	—
Hydrogen, ...	903	1,000	1,000	1,000	1,220
Nitrogen,.......	1,000	1,000	1,000	1,000	—
Carbonic Acid. .	1,258	1,000	1,000	1,175	1,087
Carburett. Hyd.	1,553	1,060	1,000	1,531	
Carbonic oxide,	1,034		1,000	1,000	
Nitrous gas, ..	1,350		1,000	1,160	

Notwithstanding the tendency of my own experiments, every one must feel a prejudice on a view of this table in favor of the conclusions of the English and the Genevese philosophers; namely, that all the gases have the same specific heat.

In such case however it will be necessary to assign some other cause for the indubitable results above given, or our judgment must be suspended, until a careful repetition of similar experiments may determine the conditions with other gases, and lead to some definite conclusions for the whole of this most interesting question.

§ 5.—*A few illustrations of the wet-bulb theory.*

My paper has expanded to such a formidable length, that I am loath to burthen it with many " last words :" yet I cannot refrain from pointing out an instance or two of practical application, and shewing that *d* and *f'* are as important elements in the play of meteorological phenomena as the dew-point itself, and require equally to be studied by naturalists.

1. The Baron **Hugel** remarked, that ice was formed in Cashmír with the thermometer at 44°[||] at an elevation of 15,000 feet: whence he concluded that the freezing point rose as the boiling point fell. This startling paradox is now readily explained : the air of the plains is dry enough at all times in those latitudes :—it becomes relatively drier in expanding on the mountains, while the depression simultaneously

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[*] Annales de Chimie, lxxxv. 126.

[†] Annales de Chimie, xxvi. 298.

[‡] Ditto 1829, xxxv. 5.

[§] Ditto, xli. 113.

[||] See J. A. S. vol. v. p. 186.

increases. When $t = 44°$, $D = 15.5$ which $+ .27\left(\frac{d\,30}{16.8} - d\right)$ for 15,000 feet, $= 18.5$, so that if the air were already charged with a third of its saturating quantity of vapour, the depression of 13 degrees would still cool a surface of water below the freezing point.

Gay Lussac points out a similar fact noted on Saussure's ascent of Mont Blanc. "En faisant tourner sur le *Col du géant* un thermomètre dont la boule était enveloppée d' une éponge, il a obtenu un refroidissement de 9°.3 C (16°.7 Farh.) au dessous de la température de l'air qui était de 10°.1 (50°. 2 F.) ainsi l' evaporation peut concourir avec le rayonnement pour déterminer la congélation de l'eau à la surface de la terre, dans un air dont la température serait de plusieurs degrés au-dessus de zéro*."

2. The formation of hail is readily explained on the same principle. The drops of water passing through a stratum of very attenuated dry air, perhaps even warmer than the saturated cloud they have quitted, are cooled to congelation—nay, most likely much below it, since they are not remelted in their onward progress to the earth, but are apparently enlarged by deposition of fresh moisture. Hail is seldom observed to fall in damp weather.

Thus also, frozen clouds (cirri) may be found at elevations in the air much lower than would belong by theory to a temperature of 32°, and their dissipation while still in a frozen state, is also accounted for.

3. The increase of rain drops as they approach the earth has been satisfactorily proved to originate in the deposit of atmospheric moisture on their surface, cooled below the dew-point temperature.

4. Why is not the air at sea always surcharged with moisture?

The actual tension of vapour in the air does not depend on t but t': now the bulk of the ocean maintains an uniform temperature, in general a few degrees below that of the air in the day time: f' therefore being then always less than f, saturation cannot take place, however much water may be present. But there is another reason; salt-water has a lower tension than pure water; that is, were it heated to t, its tension would not be f. It boils at $213\frac{1}{20}$ (?) in lieu of 212°, which reduces its tension about one part in 40—and the same proportion will hold good, on Dalton's hypothesis, for lower temperatures. In clear nights the air on ship board must always be fully charged with moisture, and hence the heavy dew on deck.

5. An analogous explanation can be given of the curious fact observed by M. Clement in 1821†, that if a thermometer bulb coated with lint be dipped in a saturated solution of any salt (or the salt in powder) and be held in aqueous vapour of 212°, it will acquire itself

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* Annales de Chimie, xxi. 92.

† Ure's Chemical Dictionary, p. 284.

a *higher* temperature, equal to what would be the boiling point of a similar solution. Here the saline solution at 212° cannot support a tension of f' (= 30 in.) ; deposition therefore takes place with consequent disengagement of latent heat, until the tension of the salt at $t + x$ finds itself in equilibrio, or = 30 inches*.

6. **Perkins** has observed, that when water is thrown upon a heated metal not visibly red, it *flashes* into steam suddenly : but when placed upon iron, silver or gold at a much higher heat, it takes a considerable time to evaporate. Here would seem to be an indication that at or about 1200 Farh. the evaporation point gradually rises to exactly 212°, and that beyond this it becomes negative, or, the depression becomes so great that it falls below the boiling point†.

This is surely a more rational explanation than **Perkins's**, who supposed the liquid to be prevented from evaporating from the enormous pressure on its surface :—how could such a false equilibrium hold with free space around for the vapour to expand into ?

Many other illustrations might be brought forward, but I forbear from exhausting the patience of my readers, and will here conclude with the tables for the depression of the wet-bulb at temperatures from 30° to 180° under the constant pressure of 30 inches. For other states of the barometer the small table below will be found sufficient, until my friends in Nepál, Dehra Dun, or the Nilgíris may furnish better data for its correction.

Table of Multipliers, *to convert the following Tabular Depressions at* 30 *inches* (1·000) *into the depressions at any other pressure of the atmosphere.*

Barometer inches.	Density of the air. e.	Multiplier $1+.27\overline{e-}$	Barometer inches.	Density of the air.	Multiplier $1+.27\overline{e-1}$	Barometer inches.	Density of the air. e.	Multiplier $1+.27\overline{e-1}$
29·5	1·016	1·004	24·5	1·224	1·060	19·5	1·538	1·145
29·0	1·034	1·009	24·0	1·250	1·067	19·0	1·579	1·156
28·5	1·053	1·014	23·5	1·277	1·075	18·5	1·621	1·168
28·0	1·071	1·019	23·0	1·304	1·082	18·0	1·666	1·180
27·5	1·091	1·025	22·5	1·333	1·090	17·5	1·720	1·194
27·0	1·111	1·030	22·0	1·364	1·098	17·0	1·765	1·206
26·5	1·132	1·036	21·5	1·395	1·107	16·5	1·818	1·221
26·0	1·154	1·042	21·0	1·428	1·115	16·0	1·875	1·236
25·5	1·176	1·048	20·5	1·463	1·125	15·5	1·935	1·252
25·0	1·200	1·054	20·0	1·500	1·135	15·0	2·000	1·270

Note.—When the depression in attenuated air has been observed, *divide* it by the multipliers here given, before entering the table following to find the aqueous tension.

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* A new source of error in the wet-bulb is hence suggested, in the substance with which the bulb is coated :—flannel, linen, and cotton may have different hygrometric affections. This is a fit subject for inquiry.

† The very slight modification required in the theoretical curve of depressions, to produce the effect alluded to in the text, is shewn by a dotted line in Fig. 5 of Pl. XXI. **Apjohn's** temperature of evaporation only reaches 212° at 2800°. **Leslie's** at 2600° ; beyond which it would continue to rise.

TABLE *of the* **DEPRESSIONS** *of the Wet-bulb Thermometer, for degrees of temperature, and every twentieth part of hygrometric saturation*:

Tempe-rature.	The centesimal tension of vapour, or percentage of humidity being																			
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	65	90	95
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
30	10·6	9·2	8·3	7·6	6·9	6·4	5·8	5·3	4·8	4·4	4·0	3·5	3·1	2·6	2·3	1 9	1·6	1·1	0·7	0·3
31	10·9	9·4	8·5	7·8	7·1	6·5	6·0	5·4	5·0	4 5	4·1	3·6	3·2	2·8	2·3	1·9	1·6	1·1	0·7	0·4
32	11·2	9·7	8·8	8·0	7·3	6·7	6·2	5·6	5·1	4·6	4 2	3·7	3·3	2 8	2·4	2·0	1·6	1·1	0·8	0·4
33	11·5	10·0	9·8	8·2	7·5	6·9	6·3	5·7	5·3	4·8	4·3	3·8	3·4	2·9	2·5	2·0	1·7	1·1	0·8	0·4
34	11·8	10·2	9·2	8·4	7·7	7·1	6·5	5·9	5·4	4·9	4·4	3·9	3·5	3·0	2·5	2·1	1·7	1·2	0·8	0·4
35	12·1	10·5	9·5	8·7	7·9	7·3	6·6	6·0	5·5	5·0	4·5	4·0	3·5	3·1	2·6	2·1	1·8	1·2	0·8	0·4
36	12·4	10·8	9·7	8·9	8 1	7·4	6·8	6·2	5·7	5·1	4·6	4·1	3·6	3·2	2·7	2·2	1·8	1·2	0·8	0·4
37	12·7	11·0	9·9	9·1	8·3	7·6	7·0	6·3	5·8	5·3	4·7	4·2	3·7	3·2	2·7	2·2	1·9	1·3	0·9	0·4
38	13·0	11·3	10·2	9·3	8·5	7·8	7·1	6·5	5·9	5·4	4·9	4·3	3·8	3·3	2·8	2·3	1·9	1·3	0·9	0·4
39	13·3	11·5	10·4	9·5	8·7	8·0	7·3	6·6	6·1	5·5	5·0	4·4	3·9	3·4	2·9	2·3	1·9	1·3	0·9	0·4
40	13·6	11·8	10·6	9·7	8·9	8·1	7·5	6·8	6·2	5·6	5·1	4·5	4·0	3·5	2·9	2·4	2·0	1·4	0·9	0·4
41	13·9	12·0	10·9	9 9	9·1	8·3	7·6	7·0	6·4	5·8	5·2	4·6	4·1	3·5	3·0	2·5	2·0	1·4	0·9	0·4
42	14·2	12·3	11·1	10·2	9·3	8·5	7·8	7·1	6·5	5·9	5·3	4·7	4·2	3·6	3·1	2·5	2·1	1·4	1·0	0·5
43	14·6	12·6	11·4	10·4	9·6	8·8	8·0	7·3	6·7	6·0	5·4	4·8	4·3	3·7	3·1	2·6	2·1	1·5	1·0	0·5
44	14·9	12·9	11·6	10·7	9·8	8·9	8·2	7·5	6·8	6·2	5·6	5·0	4·4	3·8	3·2	2·6	2·2	1·5	1·0	0·5
45	15·3	13·3	11·9	10·9	10·0	9·2	8·4	7·7	7·0	6·3	5·7	5·1	4·5	3·9	3·3	2·7	2·2	1·5	1·0	0·5
46	15·6	13·5	12 2	11·2	10·2	9·4	8·6	7·8	7·1	9·5	5·8	5·2	4·6	4·0	3·4	2·8	2·3	1·6	1·1	0·5
47	16·0	13·9	12·5	11·4	10·5	9·6	8·8	8·0	7·3	6·6	6·0	5·3	4·7	4·1	3·4	2·8	2·3	1·6	1·1	0·5
48	16·3	14·1	12·7	11·7	10·7	9·8	9·0	8·2	7·5	6·8	6·1	5·4	4·8	4·1	3·5	2·9	2·4	1·6	1·1	0·5
49	16·7	14·5	13·0	11·9	10·9	10·0	9·2	8·4	7·6	6·9	6·2	5·6	4·9	4·2	3·6	2·9	2·4	1·7	1·1	0·5
50	17·1	14·8	13·3	12·2	11·2	10·3	9·4	8·6	7·8	7·1	6·4	5·7	5·0	4·4	3·7	3·0	2·5	1·8	1·2	0 6
51	17·5	15·2	13·7	12·5	11·5	10·5	9·6	8·8	8·0	7·3	6·5	5·8	5·1	4·5	3·8	3·1	2·5	1·8	1·2	0·6
52	17·9	15·5	14·0	12·8	11·7	10·7	9·8	9·0	8·2	7·4	6·7	6·0	5·3	4·6	3·9	3·2	2·6	1·8	1·2	0·6
53	18·3	15·9	14·3	13·1	12·0	11·0	10·1	9·2	8·4	7·6	6·8	6·1	5·4	4·7	3·9	3·2	2·6	1·9	1·2	0.6
54	18.7	16·2	14·6	13·4	12·3	11·2	10·3	9·4	8·6	7·8	7·0	6·3	5·5	4·8	4·0	3·3	2·7	1·9	1·3	0·6
55	19·1	16·5	14·9	13·7	12·5	11·5	10·5	9·6	8·7	7·9	7·1	6·4	5·6	4·9	4·1	3·4	2·7	1·9	1·3	0·6
56	19·6	17 0	15·3	14·0	12·8	11·8	10·8	9·8	9·0	8·1	7·3	6·5	5·8	5·0	4·2	3·5	2·8	2·0	1·3	0·6
57	20 0	17·3	15·6	14·3	13·1	12·0	11·0	10·0	9·2	8·3	7·5	6·6	5·9	5·1	4·3	3·5	2·9	2·0	1·4	0·7
58	20·4	17·7	15·9	14·6	13·4	12·2	11·2	10.2	9·3	8·5	7·6	6·8	6·0	5·2	4·4	3·6	2·9	2·1	1·4	0·7
59	20 8	18·0	16.2	14·9	13·6	12·5	11·4	10·4	9·5	8·6	7·8	6·9	6·1	5·3	4·5	3·7	3·0	2·1	1·4	0·7
60	21·3	18·5	16.6	15·2	14·0	12·8	11·7	10·7	9·7	8·8	9·0	7·1	6·3	5·4	4·6	3·8	3·1	2·2	1·4	0·7

TABLE *of the* DEPRESSIONS *of a Wet-bulb Thermometer, for degrees of temperature, and every twentieth part of hygrometric saturation.*

Temperature.	The centesimal tension of vapour, or percentage of humidity being																			
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
61	21·7	18·8	16·9	15·5	14·2	13·0	11·9	10·9	9·9	9·0	8·1	7·2	6·4	5·5	4·7	3·8	3·1	2·2	1·5	0·7
62	22·2	19·2	17·3	15·9	14·6	13·3	12·2	11·1	10·2	9·2	8·3	7·4	6·5	5·7	4·8	3·9	3·2	2·3	1·5	0·7
63	22·6	19·6	17·6	16·2	14·8	13·6	12·4	11·3	10·3	9·4	8·4	7·5	6·6	5·8	4·8	4·0	3·2	2·3	1·5	0·7
64	23·1	20·0	18·0	16·5	15·1	13·9	12·7	11·6	10·6	9·6	8·6	7·7	6·8	5·9	4·9	4·1	3·3	2·4	1·6	0·8
65	23·5	20·4	18·4	16·8	15·4	14·1	12·9	11·8	10·8	9·7	8·8	7·8	6·9	6·0	5·0	4·1	3·4	2·4	1·6	0·8
66	24·0	20·8	18·7	17·2	15·7	14·4	13·2	12·0	11·0	10·0	9·0	8·0	7·0	6·1	5·1	4·2	3·4	2·4	1·6	0·8
67	24·4	21·1	19·1	17·5	16·0	14·6	13·4	12·2	11·2	10·1	9·1	8·1	7·2	6·2	5·2	4·3	3·5	2·5	1·7	0·8
68	24·9	21·6	19·4	17·8	16·3	14·9	13·7	12·5	11·4	10·3	9·3	8·3	7·3	6·3	5·3	4·4	3·6	2·5	1·7	0·8
69	25·4	22·0	19·8	18·1	16·7	15·2	14·0	12·7	11·6	10·5	9·5	8·4	7·5	6·5	5·4	4·5	3·6	2·6	1·7	0·8
70	25·9	22·4	20·2	18·5	17·0	15·3	14·2	13·0	11·9	10·7	9·7	8·6	7·6	6·6	5·5	4·6	3·7	2·6	1·8	0·8
71	26·4	22·9	20·6	18·8	17·3	15·6	14·5	13·2	12·1	10·9	9·9	8·8	7·8	6·7	5·7	4·7	3·8	2·7	1·8	0·9
72	26·8	23·2	20·9	19·1	17·6	15·9	14·7	13·4	12·3	11·1	10·0	8·9	7·9	6·8	5·7	4·7	3·8	2·7	1·8	0·9
73	27·3	23·7	21·3	19·5	17·9	16·2	15·0	13·7	12·5	11·3	10·2	9·1	8·0	7·0	5·8	4·8	3·9	2·8	1·9	0·9
74	27·8	24·1	21·7	19·8	18·2	16·5	15·3	13·9	12·7	11·5	10·4	9·3	8·2	7·1	6·0	4·9	4·0	2·8	1·9	0·9
75	28·3	24·5	22·1	20·2	18·6	16·8	15·6	14·2	13·0	11·7	10·6	9·4	8·3	7·2	6·1	5·0	4·0	2·9	1·9	0·9
76	28·8	25·0	22·4	20·5	18·9	17·1	15·8	14·4	13·2	11·9	10·8	9·6	8·5	7·3	6·2	5·1	4·1	2·9	2·0	0·9
77	29·3	25·4	22·8	20·9	19·2	17·4	16·1	14·7	13·4	12·1	10·9	9·7	8·6	7·5	6·3	5·2	4·2	3·0	2·0	1·0
78	29·8	25·8	23·2	21·3	19·5	17·7	16·4	14·9	13·6	12·4	11·1	9·9	8·8	7·6	6·4	5·3	4·2	3·0	2·0	1·0
79	30·3	26·3	23·6	21·6	19·9	18·0	16·7	15·2	13·9	12·6	11·3	10·1	8·9	7·7	6·5	5·4	4·3	3·1	2·1	1·0
80	30·8	26·7	24·0	22·0	20·2	18·3	16·9	15·5	14·1	12·8	11·5	10·3	9·0	7·8	6·6	5·4	4·4	3·1	2·1	1·0
81	31·3	27·1	24·4	22·3	20·5	18·6	17·2	15·7	14·3	13·0	11·7	10·4	9·2	8·0	6·7	5·5	4·5	3·2	2·1	1·0
82	31·8	27·6	24·7	22·7	20·9	18·9	17·5	16·0	14.6	13·2	11·9	10·6	9·3	8·1	6·8	5·6	4·5	3·2	2·2	1·0
83	32·3	28·0	25·1	23·0	21·2	19·2	17·8	16·2	14·8	13·4	12·1	10·8	9·5	8·2	6·9	5·7	4·6	3·3	2·2	1·1
84	32·8	28·4	25·5	23·4	21·5	19·5	18·0	16·5	15·0	13·6	12·3	10·9	9·6	8·4	7·0	5.8	4·7	3·3	2·2	1·1
85	33·3	28·9	25·9	23·8	21·8	19·8	18·3	16·7	15·2	13·8	12·5	11·1	9·8	8·5	7·1	5·9	4·7	3·4	2·3	1·1
86	33·9	29·4	26·4	24·2	22·2	20·7	18·6	17·0	15·5	14·1	12·8	11·3	10·0	8·6	7·3	6·0	4·8	3·5	2·3	1·1
87	34·4	29·8	26·8	24·5	22·6	21·0	18·9	17·3	15·7	14.3	13·0	11·5	10·1	8·8	7·4	6·1	4·9	3·5	2·3	1·1
88	34·9	30·2	27·1	24·9	22·9	21·3	19·2	17·5	16·0	14·5	13·1	11·6	10·3	8·9	7·5	6·2	5·0	3·6	2·4	1·1
89	35·4	30·7	27·6	25·3	23·2	21·6	19·5	17·8	16·2	14·7	13·3	11·8	10·4	9·0	7·6	6·3	5·0	3·6	2·4	1·2
90	36·0	31·2	28·0	25·7	23·6	22·0	19·8	18·1	16·5	14·9	13·6	12·0	10·6	9·2	7·7	6·4	5·1	3·7	2·4	1·2
91	36·5	31·6	28·4	26·1	23·9	22·3	20·1	18·3	16·7	15·1	13·7	12·2	10·7	9·3	7·8	6·5	5·2	3·7	2·5	1·2

TABLE *of the* **DEPRESSIONS** *of a Wet-bulb Thermometer, for degrees of temperature, and every twentieth part of hygrometric saturation.*

Temperature.	The centesimal tension of vapour, or percentage of humidity being																			
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95
o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
92	37·1	32·1	28·9	26·5	24·3	22·7	20·4	18·6	17·0	15·4	14·0	12·3	10·8	9·5	8·0	6·6	5·3	3·8	2·5	1·2
93	37·6	32·5	29·3	26·8	24·7	23·0	20·7	18·9	17·2	15·6	14·2	12·5	10·9	9·6	8·1	6·6	5·3	3·8	2·6	1·2
94	38·2	33·0	29·8	27·3	25·0	23·3	21·0	19·2	17·5	15·8	14·4	12·7	11·1	9·7	8·2	6·8	5·4	3·9	2·6	1·3
95	38·7	33·5	30·2	27·6	25·4	23·6	21·3	19·4	17·7	16·1	14·6	12·9	11·3	9·9	8·3	6·8	5·5	4·0	2·6	1·3
96	39·3	34·1	30·8	28·1	25·8	23·6	21·6	19·7	15·1	16·3	14·7	13·1	11·5	10·0	8·7	6·9	5·5	4·0	2·7	1·3
97	39·8	34·5	31·2	28·5	26·1	23·9	21·9	20·0	15·3	16·5	14·9	13.3	11·7	10·1	8·8	7·0	5·6	4·1	2·7	1·3
98	40·4	35·0	31·6	28·9	26·5	24·2	22·2	20·3	05·6	16·8	15·1	13.5	11·9	10·3	8.9	7·1	5·6	4·7	2·7	1·3
99	41·0	35·5	32·1	29·3	26·9	24·6	22·5	20·6	15·9	17·0	15·3	13.7	12·0	10·4	9·0	7·2	5·7	4·8	2·8	1·3
100	41·6	36·1	32·6	39·8	27·3	25·0	22·9	20·6	16·2	17·3	15·5	13.9	12·2	10·6	9·2	7·4	5·8	4·8	2·8	1·4
101	42·2	36·6	33·0	40·2	27·7	25·3	23·2	20·9	16·4	17·5	15·8	14.1	12·4	10·8	9·3	7·5	5·9	4·9	2·9	1·4
102	42·8	37·1	33·5	40·6	28·1	25·7	23·5	21·5	16·7	17·8	16·0	14.3	12·6	10·9	9·4	7·6	6·0	5·0	2·9	1·4
103	43·4	37·6	34·0	41·1	28·5	26·0	23·9	21·8	17·0	18·0	16·2	14.5	12·7	11·1	9·6	7·7	6·1	5·0	2·9	1·4
104	44·0	38·1	34·4	41·5	28·9	26·4	24·2	22·1	17·3	18·3	16·4	14.7	12·9	11·2	9·7	7·8	6·2	5·1	3·0	1·4
105	44·6	38·7	35·0	41·9	29·2	26·8	24·5	22·4	17·5	18·5	16·7	14.9	13·0	11·4	9·8	7·9	6·2	5·1	3·0	1·5
106	45·2	39·2	35·4	42·4	29·6	27·1	24·9	22·7	17·8	18·8	16·9	15.1	13·2	11·5	10·0	8·0	6·3	5·2	3·1	1·5
107	45·8	39·7	35·9	42·8	30·0	27·5	25·2	23·0	18·1	19·0	17·1	15.3	13·4	11·7	10·1	8·1	6·4	5·3	3·1	1·5
108	46·4	40·2	36·3	43·2	30·4	27·8	25·5	23·3	18·4	19·3	17·3	15.5	13·5	11·8	10·2	8·2	6·5	5·3	3·1	1·5
109	47·0	40·7	36·8	43·6	30·8	28·2	25·8	23·6	18·6	19·5	17·6	15.7	13·7	12·0	10·3	8·3	6·6	5·4	3·2	1·5
110	47·6	41·3	37·3	44·1	31·2	28·6	26·2	23·9	18·9	19·8	17·8	15.9	13·9	12·1	10·5	8·4	6·7	5·4	3·2	1·6
120	53·9	46·7	42·2	48·6	35·3	32·3	29·6	27·0	21·8	22·4	20·1	18.0	15·7	13·7	11·8	9·5	7·5	6·1	3·7	1·8
130	60·5	52·4	47·4	53·3	39·7	36·3	33·3	30·4	24·8	25·1	22·6	20.2	17·7	15·4	13·3	10·7	8·5	6·8	4·1	2·0
140	67·3	58·3	52·7	58·2	44·1	40·4	37·0	33·8	27·9	27·9	25·2	22.5	19·7	17·2	14·7	11·9	9·4	7·5	4·6	2·2
150	74·3	64·4	58·2	63·2	48·7	44·6	40·1	37·3	31·1	30·8	27·8	24.8	21·7	18·9	16·2	13·1	10·4	8·2	5·0	2·4
160	81·5	70·7	63·8	68·3	53·5	48·9	44·8	40·9	34·4	33·8	30·5	27·2	23·9	20·8	17·8	14·4	11·4	8·9	5·5	2·7
170	88·9	77·1	69·6	73·6	58·3	53·3	52·9	44·6	37·8	36·9	33·2	29·7	26·0	22·7	19·4	15·7	12·4	9·7	6·0	2·9
180	96·5	83·7	75·5	79·1	63·3	57·9	57·1	48·4	41·3	40·1	36·1	32·2	28·3	24·6	21·0	17·1	13·5	10·5	6·6	3·2
184	100·0	86·7	78·3	71·6	65·6	60·	55·	50·2	45·8	41·5	37·4	33·4	29·4	25·5	21·6	17·7	14·	10·3	6·8	3·3

To find the real quantity of moisture in the air, the *centesimal tension* deduced from this table must be multiplied into the aqueous tension for the given temperature, extracted from DALTON's, BIOT's, or URE's tables.

VI.—*Proceedings of the Asiatic Society.*

Wednesday Evening, 3rd August, 1836.

The Honorable Sir Edward Ryan, President, in the chair.

Mr. W. Spiers, proposed at the last meeting, was ballotted for, and duly elected a Member of the Society.

Mr. Conductor Dawe, of the Delhi Canal Establishment, proposed at the last meeting, was, upon the favorable report of the Committee of Papers, elected an associate member.

Mekhara Meng, uncle of the present King of Ava, acknowledged his election as an honorary member in a Bengálí letter, of which the following is a literal translation :—

Mekhara Ra'ja *to the learned Members of the Asiatic Society of Calcutta, commands.*

I am informed of the contents of the letter from this learned body, and of the honour they have done to me. But so difficult is the attainment of knowledge, that I can by no means hold myself worthy of such a distinction. The progress of knowledge may be likened to the ascent of a lofty mountain,—he that attains the summit will gain the first glimpse of the rising sun, then he in the centre, while yet it is hidden from the crowd at the base. The sun is to them a thing entirely imperceptible. Afterwards, when the solar orb declines, it still remains visible and palpable to him who has surmounted the hill, while the others have a partial and fading remembrance of its glory. Thus are there gradations in the acquirement and appreciation of learning, and there is no limit to its increase, nor can any thing compare with its excellence.

The enjoyments of worldly life are finite, and afford little variety—riches bring satiety ; but there is no satiety in knowledge. Every day brings novel food to the mind, and only whets the appetite for more. I do not then think myself learned, but it is a law of nature that the bulk of each species should remain on an equality, whether man, beast, reptile, tree, or land itself—and hold social commune with its fellows.

My name has been inserted in the list of the learned men—I am glad to hear it, for the mind that cannot traverse alone the field of knowledge ; in company of judicious guides, may derive instruction and advantage at every step. I shall know what I have not known—hear what I have not heard. All my doubts may be explained, my conjectures certified :—therefore am I filled with joy, for I would have my ignorance enlightened.

Should the Society wish to know any thing relative to the Burmese literature of my country, I will do my utmost to supply every information.

As the learned members are acquainted with various languages, I have caused this letter to be written in the Pálí language* and in the Bengálí character.

The Secretary read the following reply from Government to the application made, in conformity with the resolution of the last meeting, on the subject of the publication of the Cochin Chinese Dictionary.

To James Prinsep, Esq.

Genl. Dept. *Secretary to the Asiatic Society.*

Sir,

I am directed to acknowledge the receipt of your letter, dated the 11th instant, and in reply to state that the Right Honorable the Governor General of India in Council will be prepared to sanction an expense of 5,500 rupees to be incurred in printing a Cochin Chinese Dictionary by Lithography in the manner proposed by the author; but his Lordship would prefer much, that in order to make the work accessible to seafaring persons and traders as well as to the learned, the explanation should be given in English as well as in Latin, and that a Vocabulary rendering the common English words into Cochin Chinese should be added to the volume.

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* The letter contains an admixture of Pálí words, but the substance is in Bengálí, and is evidently a very imperfect rendering of the author's expressions by a Bengálí writer.

2. His Lordship would hope that by compressing the writing in the page which is rather wide in the specimens transmitted, these additions could be brought nearly within the same compass so as to occasion very little additional expense.

3. The specimen which accompanied your letter is herewith returned.

I am, &c.
H. T. PRINSEP,
Secy. to Govt.

Council Chamber, the 20th July, 1836.

In consequence of the above suggestions, the Secretary had, in consultation with the author, returned the following reply:—

To H. T. PRINSEP, ESQ.
Secretary to the Government of India, Genl. Dept.

SIR,

I have the honor to acknowledge the receipt of your letter, dated the 20th July last, communicating the acquiescence of the Right Honorable the Governor General of India in Council to the proposition submitted by myself, on the part of the Asiatic Society, and of the most Rev. the Bishop of Isauropolis, for the publication of a Cochin Chinese Dictionary in lithography at an expense not exceeding 5,500 rupees.

I have accordingly placed myself in communication with the author, with a view to arrange the preliminaries without loss of time, as well as to provide for the modifications recommended by his Lordship in Council.

The Bishop is of opinion that the addition of a column of English meanings to the Dictionary in its present form would involve a very serious increase of labour in passing it through the press; it would also augment the bulk of the work very considerably; while a very large portion of the words and explanations connected with literary and abstract terms would be of no utility whatever to the commercial class or to seafaring persons.

The object contemplated by his Lordship in Council may, he thinks, be supplied with more facility by the addition of a Supplementary Vocabulary containing all the most common words, which might also be published in a detached form for the use of mariners and traders.

This Vocabulary the author undertakes to draw up in the English, French, and Anamitan tongues, during the progress of the publication; and precaution has been taken to include this additional matter in the estimates which have been called for.

His Lordship's remarks on the appearance of the lithographed specimen, and the obvious advantage, if possible, of securing to a standard work of this nature the advantages and neatness of typography, induced me to communicate again with the Proprietors of the Serampore Press, before any final arrangements should be made.

The Bishop on his own part handsomely consented to relinquish 500 rupees out of the 4,000 rupees of personal remuneration for which he had at first stipulated. I was thus enabled to offer a clear sum of 2,000 rupees to Rev. Dr. MARSHMAN for the execution of 500 copies of a quarto volume, containing nearly 500 pages, with the native words in the Cochin-Chinese character. This offer, although much below the usual Calcutta printing rates for ordinary works, has been in the most liberal manner accepted by the Rev. Dr. and Mr. J. MARSHMAN.

I now therefore only wait for the final sanction of Government to place the MSS. &c. in their hands.

I am, &c.
(Signed) JAMES PRINSEP,
Secy.

Calcutta, 1st August, 1836.

To this letter the following reply had just been received :—

To JAMES PRINSEP, ESQ.
Secretary to the Asiatic Society.

SIR,

I am directed by the Right Honorable the Governor General of India in Council to acknowledge the receipt of your letter dated the 1st instant, and in reply to state that his Lordship entirely approves the arrangement made by you on the part of the Asiatic Society for the publication at the Serampore Press of the Anamitan Dictionary prepared by the Most Reverend the Bishop of Isauropolis, at the charge already sanctioned, of 5,500 rupees.

2. The modifications made in the original proposition seem to his Lordship in Council calculated very much to improve the work, and entirely meet the wishes expressed in my letter dated 20th ultimo.

3. The Governor General in Council has much satisfaction in acknowledging the disinterested and public-spirited offer made by the Right Reverend author, to forego a portion of the remuneration allotted to him in order to obtain the advantage of having the work published in type ; and the terms accepted by Dr. MARSHMAN of Serampore appear to his Lordship in Council to be not less liberal ; for the rate at which they have agreed to print the work in the original character is such as can afford them little or no profit.

4. It is the wish of the Governor General in Council that additional copies should be printed of the Vocabulary proposed to be added ; and if this should occasion an increase of expense, his Lordship in Council will have no objection to defray the amount that may be charged on this account, taking for Government an additional 100 copies of this part of the work.

I am, Sir, &c.

Council Chamber, the 3rd Aug. 1836.
H. T. PRINSEP,
Sec. to Govt.

The liberality of the proprietors of the Serampore Press in undertaking to print the work without any hope of profit, or even at the risk of some sacrifice, was fully appreciated by the Society, and the best thanks of the meeting were conveyed to Dr. MARSHMAN, who was present.

A bill from the Orphan Press for printing the 1st part of the twentieth volume of Researches, 248 pages, amounting to C.'s Rs. 1806 6 4, was presented and passed.

Oriental Publications.

The Secretary reported the completion of the *Naishadha-Cheritra* (1st part, 900 pages) one of the Sanscrit works transferred from the Committee of Public Instruction ; of which copies were ready for distribution. By the terms of agreement with the Editor, PREMA CHANDRA PANDITA, of the Calcutta Sanscrit College, who had supplied the tiká or commentary, 100 copies were to be given to him in lieu of pecuniary remuneration, which was approved.

Library.

The following books were presented :—

Results of Astronomical Observations made at the Madras Observatory during the years 1834 and 1835—*presented by the Madras Government, through Colonel Casement, Mil. Sec. Sup. Govt.*

Jahrbucher der Literatur, No. 69, 70, 71, and 72—*presented by the Baron Joseph Von Hammer.*

Notizia di Diciotto Codici Persiani della Biblioteca della Regia Universitá di Torino—*by the same.*

Memoire sur deux Coffrets Gnostiques du moyen age—*by the same.*

Mamik und Afra, a German Poem, translated from the Persian—*by the same.*

Historical Oriental Translations and Researches, 2 vols. quarto, by the Rev. W. TAYLOR, Madras—*presented by the author.*

Journal of the Royal Asiatic Society of Great Britain and Ireland, No. 4—*by the Society.*

A descriptive and illustrated catalogue of the Physiological Series of Comparative Anatomy, contained in the Museum of the Royal College of Surgeons in London, Vol. III. Part I.—*by the President of the College.*

The Sixth Annual Report of the Society of Natural History of the Mauritius—*by M. Julien Des Jardins, Sec.*

Madras Journal of Literature and Science, No 12, for April and July, 1836—*by the Madras Literary Society.*

The Indian Journal of Medical Science, No. 8, and Review of Works on Science—*by F. Corbyn, Esq. the Editor,*

Meteorological Register for June 1836—*by the Surveyor General.*

The following books were received from the booksellers:—

Lardner's Cabinet Cyclopedia—Botany, 1 vol.

————, Foreign Statesmen, vol. 2nd.

Museum.

Read a letter from J. BELL, Esq. Secretary Agricultural and Horticultural Society, forwarding for the acceptance of the Society two blankets and two woollen cloths on behalf of Lieutenant H. VETCH.

The blankets are made from the *Simúl* tree; the woollen cloths are of Bhotian manufacture.

Literary Communications.

The Government of Madras referred for the consideration of the Society, through the Supreme Government, a proposition submitted by CAVELLY VENKATA LACSHMIA, Pandit, to re-establish the system of Historical Research so successfully pursued by the late Col. COLIN MACKENZIE in the Peninsula, by collecting inscriptions, manuscripts, grants, &c. as well as to translate and digest the mass of materials already collected, and now in the possession of the Royal Asiatic Society.

CAVELLY VENKATA had drawn up a report-progress of the researches, in which he states himself to be still engaged, classifying the different dynasties, ancient and modern, of South India, on which light has been thrown by the Mackenzie collection. This paper and the correspondence were referred to the Committee of Papers for their examination and report, previous to discussion of the question in the Society.

Mr. W. H. MACNAGHTEN presented an elaborate Memoir by Lieut.-Colonel BURNEY, Resident in Ava, entitled "An account of the wars between Burmah and China, together with the journals and routes of three different embassies sent to Pekin by the king of Ava, taken from Burmese documents.

[Referred to the Committee of Papers. This account has peculiar interest at the present moment, when the offer of Mr. GUTZLAFF to penetrate through China to Ava or Assam has been much discussed.]

Mr. TREVELYAN on behalf of M. C. MASSON presented a third memoir on the coins discovered at Beghram.

This paper is a careful and laborious recapitulation of all that has been done in this curious branch of discovery, with the addition of the results of a third year's search. The acquisition of new coins and new names naturally becomes every day more rare; so that notwithstanding the addition of 2,294 coins to his cabinet in the year 1835, the only real novelties are an unique coin of **Archebius**, one of **Diomedes** (found in 1834) the confirmation of **Adelphortos** and **Ipalirisus**. Three Euthydemus', and one Antiochus have been gained; the ratio of the more common Bactrian and Indo-Scythic names is much the same as in former years. We shall hasten to publish such portions of M. **Masson's** most industrious labours as have not hitherto appeared in our pages.

Mr. **Avdall** brought to the Society's attention a singular narrative, in translation, of the interview between **Arsaces**, king of Armenia, and the Persian Monarch **Sapor** (**Alaknaf.**)

[We hope to find room for this curious morceau ere long.]

The Secretary read extract of a letter from the Counsellor **Joseph Von Hammer**, of Vienna, (now Baron **Purgstall**,) forwarding a continuation of his translation of the *Mohit*, an Arabic nautical work by **Sidi Capudan**, of which the first chapter was printed in the third volume of the Journal.

The present chapter contains a catalogue of the islands along the shores of the Red Sea, and directions for thirty different voyages from Loheia, Aden, &c. to the various ports of India, Persia, and the Straits of Malacca. It is a fact difficult to be accounted for, that the learned author offered to translate the whole of this very scarce and curious work for the Oriental Translation Committee, who have given to the world so many of less consideration; but he was not honored with a reply.

Extracts were also read from other European Correspondence. Professor **Wilson** reports his having forwarded the Society's memorial regarding Oriental publications to the Royal Asiatic Society, which, in concurrence with the Oriental Translation Committee, had warmly espoused the object of its prayer. The Foreign Societies had also supported it, as far as the voice of protestation and argument by a body of the most distinguished oriental scholars can lend its influence.

Paris has set a further example which it would be unjust to the cause to omit mentioning.

Colonel **Troyer**, having presented to the Société Asiatique a German translation of the first six books of the *Ráj Tarangini*, (one of the Sanscrit works suspended by the Government order, and lately completed by the Society here,) was invited to undertake a French version of the same for publication *with the Sanscrit text* at the Society's expence, estimated at not less than 6,000 francs. It may be hoped that the edition completed in India, of which specimens must soon after have reached Paris, will spare a portion of this money for the many other objects embraced by this active association.

M. **Jacquet** announces the contemplated institution of a new professorship of the Oriental languages in the University of Ghent, which well desire to accumulate manuscripts and printed works from this country. The late discovery of coins and inscriptions in India had excited the most intense interest on the Continent, but General **Ventura's** collection had not yet reached Paris, on account of the detention of General **Allard** by illness in the South of France.

With regard to the coins of the Kadphises group, M. **Jacquet** having seen **Honigberger's** collection would read the name *Mokadphises*, which he suggests to be *Mahátricha* of the Sanscrit. We await his papers on this subject in the *Journal Asiatique*.

Physical.

A collection of specimens made by Captain **Hannay** in his recent expedition up the Irawadí to the Amber mines, was presented by Colonel **Burney**.

The collection includes many varieties of white and gray marble—serpentine, agates, jaspers, heliotrope and crystal, particularly a pale green prase, much prized by the Chinese, and called by them *Yu;* it is found about 80 miles N. W. of Mogaung. Wrist rings are cut from it.

With the specimens was a substance called by the Burmese *earth wax*, which they say exudes from some high precipitous rocks above Ava. They add, that monkeys are particularly fond of this substance, and that those animals swarm about the rocks which yield it. The wax has all the appearance of common unbleached wax.

There was also a specimen of the tea prepared by the Singphos of Payendwen; and a poisonous plant used by the Mishmís, supposed by Dr. WALLICH to be identical with the *Bish* of the Gurkhas, (Aconitum;) another herb *myenthé*, used by the Mishmis for the same purpose, had more the appearance of an Acanthaceous plant.

The fossil bones from Perim in the Cambay Gulph, presented by the Baron HUGEL, had arrived. Among them is a large and indisputable fragment of a buffalo's horn, which the Baron refers with probability to the Nerbudda fossil bos; two smaller horns imbedded in matrix, (a calcareous and ferruginous conglomerate.) Also shells from a similar conglomerate in Gogo, and specimens of the cornelian, natural and burned, from the *Ratanpur* quarries.

A geological series from Pulos Floer, Trotto, Ledah, Tingy, Pigeon Island, Birdnest Island, and Dehli point, in the Straits of Malacca, was presented by Dr. BLAND, of H. M. S. *Wolf,* with a note of their locality, and some remarks on the genus of shells denominated *Pterocyclos* by BENSON (*Spiraculum* by PEARSON), found in abundance on the islet of Susson, opposite Queda Peak.

[Dr. BLAND's notes shall have early insertion.]

Specimens of a calcareous and silicious Scoria, forming the substance of a small hill at *Búdigúnta* near Courtney, about 11 miles west of Bellary, was presented by Lieut. NEWBOLD.

[The accompanying note will be inserted.]

Mr. C. W. SMITH having purchased a collection of specimens of Natural History from the Eastern Isles, presented the Mammalia, the duplicates of the Birds and the Reptiles, to the Museum, on condition of the remaining birds being mounted for him. The Mammalia and Reptiles consist of the following specimens:—The grey Roussette, (*Pteropus Griseus*) two specimens; one of a species of *Noctilionina,* and one of *Vespertilionina,* probably new genera; one of a species of Marten, agreeing in specific characters very exactly with the Pine Marten, (*Martes Vulgaris;*) two young specimens of a species of Ictus; one of the Barang Otter, (*Lutra Lutreola?*) one of the slender Delundung, (*Prionodon Gracilis;*) one of the Sumatra Cat, (*Felis Sumatrana;*) one of the Madagascar Squirrel, (*Sciurus Madagascariensis;*) one of the Jeralang, (*Sciurus Leschenaultii;*) two of the two-banded Squirrel, (*S. Bivittatus;*) and two specimens of the Java Musk Deer, (*Moschus Javanicus.*) The Reptiles are a specimen of the Eastern Box Terrapia, (*Cistuda Amboinensis;*) and one of the Clouded Monitor of GRAY's Synopsis, (*Monitor Nebulosus.*)

A specimen of Bengal Vulture, (*Vultur Bengalensis,*) presented by Major FANE.

The specimens of birds presented at the last meeting were exhibited, having been mounted in the Museum.

Physical Communications.

A memoir on the Fossil Rhinoceros of the sub-Himálayas, was forwarded by Lieuts. **Baker** and **Durand**, of the Engineers.

[This, with the lithographs and engravings kindly prepared by the authors themselves for the Journal, will be published in the ensuing number.]

Mr. **Hodgson**, of Nepál, continued his contributions of new species in two papers: 1, on the thick-billed finches; 2, on two genera of Columbidæ. Twenty-two ornithological plates were also added to the magnificent series of illustrations now under dispatch home.

A note on nest of the Bengal Vulture was submitted by Lieutenant **Hutton**.

A Register of Rain at Delhi, by the Rev. R. **Everest**.

A living specimen of the new genus of venomous snakes denominated *Hamadryas* by Dr. **Cantor**, was exhibited to the Society; it measured nearly 10 feet in length, and was caught in the *Sundarbans*.

VII.—*Miscellanea.*

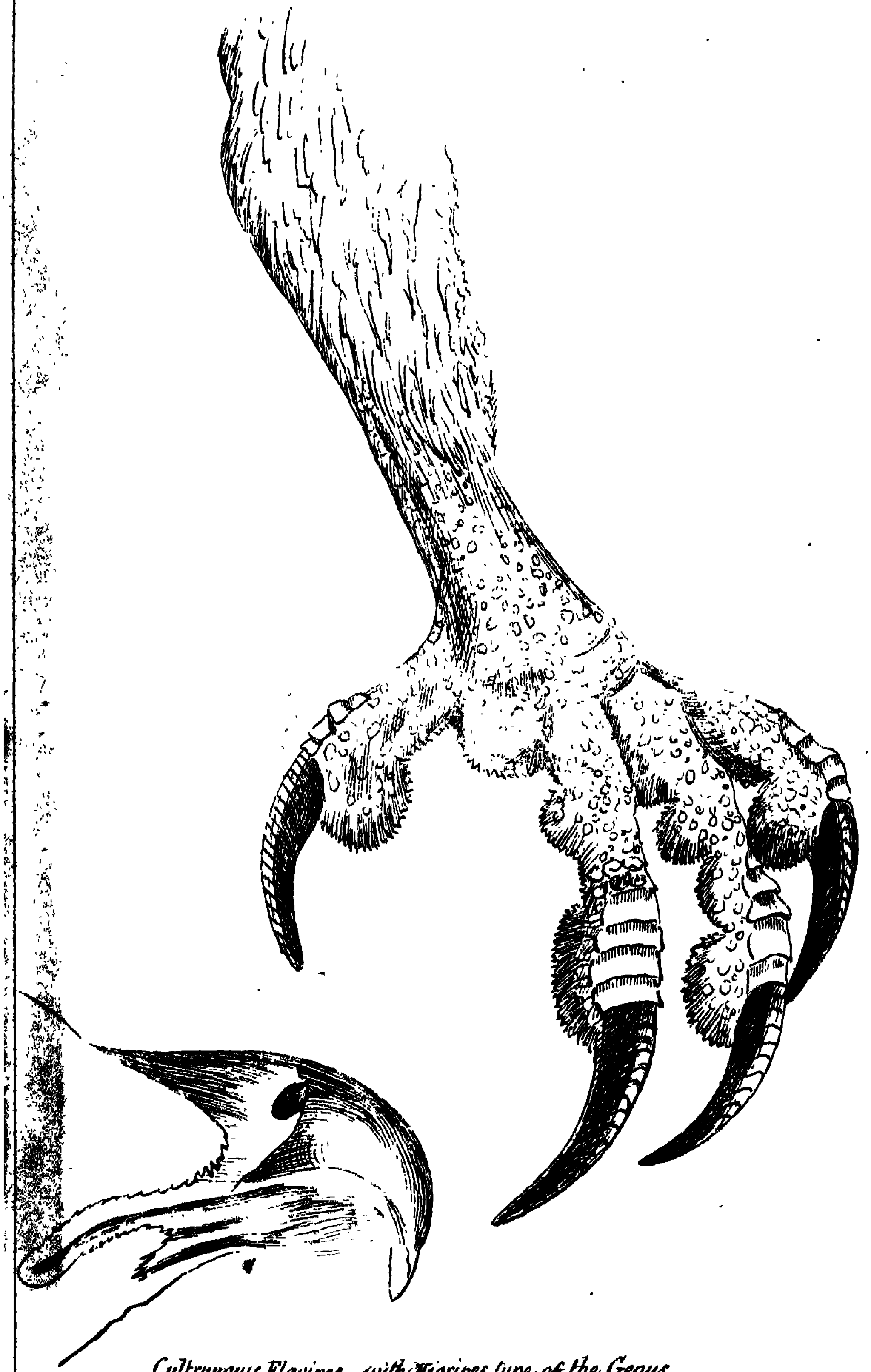
Madras Journal of Literature and Science.—It has not been hitherto our custom to enter into criticism of the contents of contemporary journals, but we cannot refrain from noticing the number issued by our sister society of Madras in July, which has just reached us and has excited—not our envy, but—our astonishment and our joy.—To say that it rivals or eclipses our own humble production in what is called "the getting up," would be, perhaps, considered little of a compliment. The fresh zeal and exertions of a new editor, (Dr. **Cole**,) are not less conspicuous in the judicious selections he has made from other works, and the valuable notes with which he has embellished them, than in the host of able contributors he has summoned to his aid;—some of whom, alas! we have hitherto boasted as our own*, but whose transfer of allegiance is but natural, when so legitimate a rival arises to claim it. The present number (four-monthly?) contains 240 pages, price only 3 rupees. Of its most rich contents we should be tempted to glean with unsparing hand, could we afford space. Dr. **Benza** has another excellent geological paper on the country between Madras and the Nilgíris. Mr. **Cole** has done a service to geology, by an accurate definition and description of the *laterite* formation.—Mr. **Taylor**'s view of the present state of astronomical science is highly interesting. It shews, that he is not one of those who merely keep up a supine routine of accustomed observations, but that all his observatory does is directed to useful ends—to the elucidation of those desiderata in the science for which its situation is best calculated. Nor is he a *Flamstead*, jealous of giving his labours into other hands, and tardy in working out results himself; for his *third volume* of observations, reduced and classified in the most compendious manner, has just issued from the Madras press. We may be indeed jealous that our Presidency should boast no similar production, and that even the astronomical labours of the Grand Trigonometrical Survey in the northern mountains should be as inaccessible and unknown as all their other operations! Colonel **Monteith**, Engineers, whose survey of part of Persia we noticed some time since, is imparting the statistical contents of his note book, accumulated during 18 years' residence in Persia. An account of the Thuggee system, by Lieutenant **Reynolds**—Observations on original and derived languages, by the Rev. B. **Schmid**, and on the language of the Battas of Sumatra, by Lieutenant **Newbold**, and the Rev. W. **Taylor**, are amongst the most interesting contents of this very creditable volume.

* Dr. **Benza**, Mr. T. G. **Taylor**, Lieut. **Newbold**.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of July, 1836.

Day of the Month.	Observations at 10 A. M.									Observations at 4 P. M.									Register Thermometer Extremes.		Rain.	Wind.			Weather.		
	New Stand. Barometer red. to 32°.	Old Stand. Barometer at 32°.	Wet Barometer at 32°.	Difference.	Thermometer in air.	Wet-bulb Thermom.	Leslie's Dif. Hygrom.	Dew point at 9 A. M.	Hair Hygrometer.	New Stand. Barometer red. to 32°.	Old Stand. Bar. at 32°.	Wet Barometer at 32°.	Difference.	Thermometer in air.	Wet-bulb Thermom.	Leslie's Dif. Hygrom.	Dew point at 2 P. M.	Hair Hygrometer.	Cold on roof.	Heat in sun on roof.		Morning.	10 A. M.	4 P. M.	Morning.	10 A. M.	4 P. M.
1	29,516	29,544	29,366	—,178	85,8	4,0	3,1	77,0		29,424	,462	29,256	,206	89,1	7,8	5,7	76,8		77,2	91,2		SW.	SW.	sw.	fine.	fine.	gathering.
2	,479	,510	,323	,227	86,4	6,5	5,0			,392	,432	,234	,198	87,9	7,7	5,7	75,8		79,0	90,0	0,75	S.	SW.	sw.	do	cumuli.	showery.
3	,514	,552	,370	,182	82,4	3,4	2,8			,429	,478	,240	,188	84,7	5,2	3,2	77,5		75,2	87,0	,10	SW.	sw.	sw.	overcast.	rain.	clear.
4	,512	,547	,364	,183	83,5	3,5	3,5	76,0		,420	,486	,251	,228	88,8	7,1	5,0	76,0		76,0	108,5	,35	o.	s.	se.	cum. strat.	fine.	cum. strat.
5	,527	,570	,392	,178	83,9	5,1	4,0	77,4		,423	,481	,268	,213	87,8	7,9	4,8			72,0	115,0	,60	E.	se.	se.	do	hazy.	showery.
6	,548	,596	,408	,188	84,9	4,4	3,4	76,5		,422	,471	,278	,143	85,9	5,2	3,1	79,9		73,6	97,0	,60	o.	ne.	se.	clear.	showers.	rain.
7	,518	,561	,370	,191	85,5	4,9	3,8	78,5		,395	,463	,231	,232	89,2	7,6	5,7			76.0	101,0	,20	ne	ne.	ne.	cloudy.	haze.	cum. strat.
8	,490	,542	,357	,185	83,7	3,5	2,7			,402	,461	,250	,211	86,8	6,8	5,0	78,4		76,2	91.0	,30	E.	ne.	ne.	cumuli.	showers.	showery.
9	,507	,532	,356	,176	85,8	4,7	3,6	78,5		,421	,465	,269	,196	84,3	2,6	2,3	74,8		75,5	93,0	2,00	Ese.	E.	o.	do	dull.	cu. strat.
10	,517	,552	,377	,175	85,1	4,7	3,6	78,0		,416	,457	,273	,134	85,1	4,0	2,5	79,8		74.6	105,3	,30	E.	se.	o.	do	cum strat.	threat.
11	,460	,490	,319	,171	83,1	4,1	3,5	76,2		,352	,412	,212	,200	84,2	5,0	2,5	76,3		76,2	95,2	,10	E.	ne.	o.	rainy.	do	overcast.
12	,515	,445	,284	,161	82,7	2,8	2,8	79,2		,351	,380	,208	,172	84,3	4,5	3,5	77,3		74,2	90,0	,60	E.	e.	E.	heavy rain.	rain.	showery.
13	,515	,560	,392	,168	82,7	2,5	2,0	78,7		,442	,488	,290	,198	85,1	5,3	3.9	77,1		73,0	85,2	,55	E.	e.	se.	nimbi.	do	fine.
14	,528	,547	,387	,160	81,6	2,6	2,1	76,5		,441	,490	,312	,178	81,5	2,5	2,1	77,8		75,3	80,0	1,10	S.E.	E.	se.	rain.	haze.	overcast.
15	,580	,607	,460	,147	80,7	1,9	2,3	78,2		,519	,565	,391	,174	83,9	3,6	2,4	78,4		73.8	84,0	1,05	Sw.	E.	se.	cum.	rain.	scud.
16	,575	,616	,442	,174	83,1	2,7	2,2	78,5											73.0	94,2	,25	Sw.	se.		do	nimbus.	
17	,615	,656	,479	,177	83,7	1,9	2,2	79.0											74,5	87,0		Sw.	sw.		fine.	cum. str.	
18	,601	,638	,447	,191	85,8	5,3	4,4	77,0		,514	,565	,373	,192	84,3	2,4	2,6	78,6		76,2	88,0	,30	Sw	sw.	se.	do	fine.	showery.
19	,539	,591	,406	,185	83,4	6,0	5,0	76,8		,422	,4[illegible]1	,268	,223	86,3	6,6	5,4	7[illegible],5		76.7	97,5		Sw.	sw.	sw.	cum str.	do	hazy.
20	,458	,514	,322	,192	83,5	4,8	3,7	76,7		,365	,432	,210	,222	8[illegible],9	6,6	5,3	76,7		77,5	94,0		Sw.	sw.	se.	cumuli.	cir. cum.	threatg.
21	,470	,520	,324	,196	84,5	4.5	3,4	77,0		,302	,441	,248	,193	83,5	3,4	2,6	78,4		74,2	105,0	1.05	e.	sw.	se.	fine.	cum strat.	showery.
22	,581	,614	,438	,176	83,9	4,6	3,1	76,9		,503	,55[illegible]	,364	,195	85,9	5,7	3,6	78,0		75,0	[illegible]2,0	,45	se.	sw.	se.	do	haze.	do
23	,634	,677	,489	,188	85,0	4,3	3,3	77.2		,542	,545	,399	,146	85,0	5,1	2,7	76,6		75,4	89,0	,50	s.	se.	s.	do	fine.	do
24	,632	,682	,492	,190	85,3	5,1		75,6											74.8	90,1		S.	se.	s	do	do	
25	,658	,710	,511	,199	85,6	5,7	4,4	77,[illegible]		,533	,610	,3[illegible]2	,238	89,7	9,4	7.2	77,7		74,5	97.9		Sw.	se.	sw.	do	cir. strat.	cum. str.
26	,637	,685	,487	,198	85,5	3,3	4,4	[illegible]6,5		,531	,6[illegible]4	,366	,233	[illegible]	8,8	6,6	77,8		77,0	97,7		S	s	sw.	do	fine.	showery.
27	,643	,702	,4[illegible]0	,212	86,3	6,7	5,6	77,0		,530	,610	,354	,256	90,5	9,9		76,0		77,7	95,8		S.	se.	sw.	do	do	cum. strat.
28	,629	,68[illegible]	,4[illegible]0	,1[illegible]6	[illegible]5,5	6,1	5,6	76,0		,503	,570	,348	,222	87,1	7,8	7,3	76,3		77,2	[illegible]2,5		S.	sw.	sw.	cum str.	hazy.	hazy.
29	,622	,673	,480	,193	85,6	5,8	5,6	75,6		,5[illegible]8	,588	,360	,228	88,8	6,8	6,0	77,5		7[illegible],2	85,0		S.	sw.	sw.	rain.	fine.	showery.
30	,643	,6[illegible]6	,5[illegible]0	,1[illegible]6	82,2	3,4	3,9	7[illegible],4		,530	,5[illegible]5	,389	,196	85,1	4,6	4,3	77,4		74,5	[illegible]6[illegible]7	1,00	o.	s.	w	rain.	showery.	cloudy.
31	,574	,610	,443	,167	81,7	4,5	3,4	74,6		,466	,521	,335	,186	81,2	4,4	3,8	75,8		74,2	[illegible]9,3	,20		sw.	se.	overcast.	overcast.	fine.
Mean,	29,556	29,596	29,411	,185	84,1	4,3	3,6	76,		29,450	,504	29,304	,204	86,2	5,8	4,3	77,4		75,4,	[illegible]3,8	12,35						

In the present month the old standard barometer has been read off with its compensation index.—The hair hygrometer has been employed in other experiments; the sulphuric acid is of spec. grav. 1.48



Cultrunguis Flavipes – with Nigripes type of the Genus
Cultrunguis

N.B. inner side of the foot: size of nature.

J. B. Tassin's Lith. Press Calcutta.

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JOURNAL

OF

THE ASIATIC SOCIETY

No. 5[illegible]—*August*, 1836.

I.—*Extracts from the* MOHIT *(the Ocean), a Turkish work on Navigation in the Indian Seas. Translated and communicated by* JOSEPH VON HAMMER, *Baron* PURGSTALL, *Aulic Counsellor, and Prof. Orient. Lang. at Vienna, Hon. Memb. As. Socy. &c. &c.*

[Continued from vol. iii. p. 553.]

[We know not how to express sufficient gratitude to our illustrious correspondent for his courtesy in allowing these pages to be the medium of publication of this curious manuscript of SIDI ALI CAPUDAN. The manner in which it was discovered by the Baron at Naples, after 30 years' fruitless inquiry, was described in the preamble of the former extract. The value set upon it by this eminent oriental scholar, induced him to offer to translate the whole for the Oriental Translation Committee; but through some accident, (we can ascribe it to no other cause,) an offer so generous has remained unacknowledged. "Without doubt," our correspondent writes, "the book would deserve much more the care of the Committee than many of minor interest published by it; but although to my volunteer I got no more answer than to my offer of an edition and translation of WASSOF, *agar hájat báshed,* as the Persians say, and with the assistance and remarks of some Indian sea-faring gentlemen on the parts already translated, I hope to send chapter after chapter to your Indian Journal, and thus we shall be independent of the Committee."

On the last occasion we derived some little assistance from the *Nakhodas* of the Arabic vessels, in recognizing the places alluded to in the Section on the monsoons. The same plan we have been prevented, in a great measure, from following now, through the absence of these traders, who only arrive here towards the end of the south-west monsoon (August-September) and return with the setting in of the north-east wind in February-March. We have, however, been able to trace most of the principal names on the map, and have marked them in foot notes. The catalogue of the names of islands in the Red Sea would be—and may, we hope, still be—of great use to the officers of the Indian navy now engaged in its survey.

We have discovered many of the islands and capes mentioned by SI'DI' in the large manuscript chart sent round for the use of the steamer *Forbes* in its passage up the Red Sea: but by far the greater number of islets remain unnamed; and to them, with a little local inquiry, SI'DI''s list might doubtless be easily applied. The book is also of great service in pointing out the maritime channels of Arab commerce, at the period perhaps of its highest prosperity, before the Portuguese, the Dutch, and the English had diverted the majority of the Europe supply to the newly discovered route by the Cape of Good Hope.

The Baron[*] is in hopes that the presen[illegible] of sea-faring Arabs will also enable us to assist him in understanding the [illegible]nor and more difficult chapters of the work, wherein is discussed the manner of "making the pole," (جاه,) or taking the altitude of the polar star. Here, however, we have little chance of success. The present navigators have adopted the improved methods of Europe:—they take their latitude by the sun, and with the modern sextant; and the richer merchants even provide their vessels with chronometers:—not that the Arabs yet possess translated tables or ephemerides by which to work the course themselves; but they almost universally employ an English sailing master, to whose superior intelligence they implicitly confide.

Nothing then have we been able to learn of the instrument used by the early navigators in taking their latitude from the circumpolar stars; or of the measure of an arc called *issabá* (اصبع) inch, and its subdivision into eight *záms* (ازوام) We find however on inquiry that the latter term is still applied to terrestrial measurement, and is well known to nautical people of the present day as the fifth part of a geographical degree, (twelve nautical miles.) Though this measure does not at all accord with the sailing distances quoted by SI'DI' CAPUDAN, from well known places, it will be seen presently to correspond exactly with the value of the celestial inch or *issabá* as deduced from the internal evidence of the work itself.

The Baron HAMMER in his private letter to us writes thus: "Concerning the measure of ازوام the first section of the IIIrd. chapter explains as follows: 'The *zám*, زام, is either the *practical* one, عرفي, or the *rhetorical*, اصطلاحي[†]; The *practical* is one of the eight parts in which day and night are divided: the *rhetorical* is the eighth part of an inch, اصبع, in he ascension, ارتفاع and descension انحطاط of the star de, if you go north and make the star جدی, *eight zám;* ated one inch: and if you go south, it is by eight *záms*, one inch depr d منحط. This is the whole section on the measure of the زام (plural, ازوا) an explanation which, however, helps me not a bit to understand he true measure of a *zám*, in the reckoning of the ship's course so fre- uently employed in the subsequent chapters. Nor have I been able to btain any explanation from our astronomers."

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[*] It seems we erred in giving that designation to Counsellor VON HAMMER in 1833; but our announcement proved prophetic; the Emperor having conferred the title on him in December 1835, upon his succeeding to the little state of Hoinfeld, bequeathed to him and his male descendants by the late Countess PURGSTALL (Cranstoun). The present paper is a proof that this accession of honors will not detract from the zeal of his Oriental studies.—ED.

[†] We are inclined to think that this word اصطلاحي *istilahiy*, is an error of the transcriber, and that it should be اصطرلابي *usturlábiy*, appertaining to the divisions of the astrolabe.—ED.

We will now venture to offer the explanation which has occurred to our- lves from perusal of the present translated chapter of voyages, and the ove extract conjointly.

1. The *zám*, in practical or vulgar parlance, is said to be the eighth art of the day and night. This, doubtless, applies to the nautical division f the twenty-four hours into 8 watches, generally prevailing among ori- ntal nations, and exactly corresponding with the 8 *pahars* of the Hindus*.

2. Again, the *zám* is seen above to be the eighth part of the ordinary ch or *issabâ;* as the *jo*, or *yava* of the Hindus, is the eighth of their *ngúl:* and the *line* of Europeans is the eighth of their inch: it is, in fact, he vulgar subdivision by two and two, both of the unit of measure and f time. Perhaps, indeed, *zám* may be a mere corruption of *jo.*

It would seem, that to suit ordinary capacities, both the *issabâ* and the *ám* had been transferred to the arc of the rude quadrant or astrolabe sed by the Arab seamen, in lieu of the more scientific division into de- rees and minutes. Or it is very possible that in still ruder times the al- itude of the polar star above the horizon was actually measured by fin- ers' breadths, the hand being held out at the natural arms' length in ront of the face: for the measure of the arc thus subtended would nearly gree with the value of the *issabâ* derived from other considerations.

The actual value of the *issabâ* in degrees and minutes may be readily ound from the latitudes, or polar altitudes, of known places extracted from Sı'dı's work. Thus the elevation of the pole Cape Guardafui is lways quoted at $4\frac{1}{8}$ inch; while at Jedda it is called 10 inches; differ- nce, $5\frac{7}{8}$ inches. The difference of latitude by our mode of reckoning is $1^{\circ}\ 28'-12^{\circ},\ 00' = 9^{\circ}\ 28'$; which gives nearly $1^{\circ}\ 37'$ for the *issabâ* or ch. Now, as before stated, we were informed by an Arab *Muallim* that he *zám* was 12 of our minutes, or 5 *záms* = 1 degree. Therefore, 8 *záms* r 1 *issabá* should be equal to 96′; or $1^{0}\ 36'$,—so close an accordance ith the foregoing result, as to leave no doubt of the value of the *issabá* and *zám* being 96′ and 12′ respectively on the celestial arc.

It still remains to explain the divisions of the lower arc of their rude instrument, and the *kiás*, or point at which the readings of the upper and lower index coincide, as also the point whence the divisions commence on both quadrants, or what may be called their index error.

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* The subdivision of the *pahar* into eight *gharis*, is like the "eight bells" into which our nautical watch is counted off.

In the description of the islands of the Arabic coast, it will be seen that as the readings of the upper limb increase, those of the lower quadrant decrease, their sum being constantly 14¼ *issabâ*.

Thus, at *Saibán*, (Loheia,) the upper reading is 6¾, lower 7½, sum 14¼.
at Jedda, ditto 10 ,, 4¼ ,, 14¼.

It is evident, therefore, that the *kiás* occurs at 7⅛ inch, or 7 *issabâ* 1 *zám*, the half of 14¼.

Again, for the zero point we have the following data :—

	true lat.		*issabâ*					*zero point*
By the Jedda latitude, ...	21° 28′	—	10	×	1° 36′	(= 16° 00′)	=	5° 28′
By the Guardafui, latitude ,........	12 00	—	4⅛	×	1 36	(= 6 36)	=	5 24
By Darwesh, or Dorish, ...	18 30	—	8	×	1 36	(= 12 48)	=	5 42
By Loheia or Saibán, ...	15 41	—	6¾	×	1 36	(= 10 48)	=	4 53
By Wasaliat, (Fossailiat,)	17 42	—	7¾	×	1 36	(= 12 24)	=	5 18
By Danek, ...	19 31	—	8½	×	1 36	(= 13 32)	=	5 59
By Haseek sinave, *(Harik-simár)*,	19 50	—	8¾	×	1 36	(= 13 56)	=	5 54

The average index error or zero point is thus found to be 5° 31′, or in round terms 5½ degrees, to be added to altitudes taken by the *issabâ* scale. The only conjecture we can offer as to the origin of such an arbitrary arrangement is, that the zero has been fixed at the lowest elevation at which it is safe to trust to the measurement by the polar star : so that mariners, on finding *polaris* fall below 0 inches, would then know they should take their latitude by *Farkadain*, or β and γ ursæ minoris.

The zero point of the under quadrant may be easily deduced from the foregoing to be at 28° 18′ below the horizontal line. This we may suppose was the highest elevation of the polar star observable by navigators in the Red Sea or in the Persian gulph. Indeed the latitude of Suez and of the mouths of the Euphrates, the most northerly ports visited by their ships, being 30°, the difference between this and 28° 18′ is very nearly equal to the north polar distance of *polaris* (1° 42′) : and in the period from January to July it would be only the inferior meridional passage that could be observed. It is generally supposed that the early astronomers regarded the polar star as stationary, and did not trouble themselves to attain even the accuracy we are giving them credit for; but an expression, which occurs in a following page, shows that this was not the case ; since it directs, that 'if it be not time to take the polar star, then another star is to be substituted.'

As a proof, however, that no great accuracy was attainable, it may be remarked that the two stars called by the Arabs *Farkadain* (β and γ ursæ minoris) are accounted to have the same altitude ; whereas in reality there is a difference of no less than three degrees in their declination ; but it is probable that the altitude was taken constantly by either the upper or the lower star, although we have no data here to decide this point.

The following table will be found very useful for the conversion of *issabâs* into degrees and minutes. In it the quadrantal difference of the *Farkadain* is assumed at 6⅞ *issabâ*, or 11°+ 5° 30′, = NPD 16° 30′, which is nearly the average north polar distance of the two stars.

North Latitude.		*Elevation of Polaris.* [*at his inferior meridional passage ?*]				*Elevation of Furkadain.*	
Degrees.	Minutes.	*By upper quadrant.* Issabâ.	Zám.	*By lower quadrant.* Issabâ.	Zám.	*By upper quadrant.* Issabâ.	Zám.
0	0					3	3½
0	54					4	0
2	30					5	0
4	6					6	0
5	30	0	0	14	2	6	7
7	6	1	0	13	2	7	7
8	42	2	0	12	2	8	7
10	18	3	0	11	2	9	7
11	54	4	0	10	2	10	7
13	30	5	0	9	2	11	7
15	6	6	0	8	2	12	7
16	54	7	1 (ki	as) 7	1		
18	18	8	0	6	2		
19	54	9	0	5	2		
21	30	10	0	4	2		
23	6	11	0	3	2		
24	42	12	0	2	2		
26	18	13	0	1	2		
28	18	14	2	0	0		

With regard to the value of the *zám* in terrestrial measurement, 12′ or 12 nautical miles* would perhaps be applicable to many of the instances in Sɪ′ᴅɪ′′s work ; for example, where he directs that in running down the Malabar coast the navigators should keep five *záms* distant from the shore, or 72 miles, which is the common practice. But to suit other cases, the *zám* must be assumed at half a degree or upwards ; and this is probably attributable to the very erroneous notions of the longitudinal distances of places prevalent before good charts were formed. With the aid of a map, however, and the bearings given by our author, it is easy to describe the track of his several voyages. We have thus derived the probable measurements given in the following notes, in which we have also given the names of the places on our charts where they were recognizable.—Ed.]

THE NINTH CHAPTER.

Containing an explanation of some Islands and Voyages, and precautions, the knowledge of which is requisite for Navigators in the Indian Seas.

First Section.—*The islands of the Arabic coast*†.

The island *Okbán*[1], north of which the island *Katáma*[2], afterwards *Sil Nobán*[3], the island *Sána*[4], then the two islands *Badhiáin*[5], the environs of which are shallow ; after them the islands *Zútheláth*[6], the

[1] عکبان [2] کتامه [3] صیل نوبان [4] سانه [5] بضیعدین [6] ذوثلاث

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* Has the terrestrial *zám* any connection with the *jojan* or *yojana* of the Hindus, which is estimated at somewhat more than 10 miles ?

† This enumeration of islands commences from near Loheia, lat. 15° 41′ on the Arabic coast, in front of which lie the islands of *Okbáne*, *Kotama*, and *Loban*, with *Camaran* a little to the south. Most of the rest are not to be found by name on Capt. Eʟwoɴ's new chart.—Eᴅ.

island *Hawal*[1], the island *Haula*[2]*, which is situated behind *Hawal;* the islands *Zú Kassár*[3]† through which great ships cannot pass; behind *Zú Kassár*, the island *Mokammar*[4]‡, and behind that the island *Hodaife*[5]§, on which are a few trees, and no passage between them on account of a great number of rocks; the island *Hodaife* is the last towards *Bákil*[6] on the seaside: the water is here very unclean. On the east side of them is a small island called *Masad*[7], but no passage between them; behind them the island *Jihán el Kebír*[8]‖, and near it on the nether side the island *Jihán ess-ssaghír*[9]¶: the sea between them is full of shallows, to east of them the island *Sásoh*[10] which is a great mountainous island: on the western side of it a shallow called *amariya*[11]. Approaching from the seaside the island *Sásoh* is in sight before the *amariya;* on this shoal the depth of the water is five fathoms *(kúláj.)* Between the two above said islands the great and little *Jihán* is also an *amariya* or shallow. Be it known that the cape of *Jazar Farsán*[12]** lies north between *Sharja*[13] and *Jazá*[14] on the sea side are the two islands *Zú Kharáb*[15]†† and *Zú Saláb*[16]. *Sásoh* is on the sea side of these two islands between south and west. On the sea side of *Sásoh* are two islands, each of which is called *Dohr jihán* (back of the world.) Be it known that the island of *Seil Mothan*[17]‡‡ is the end of the Persian islands: on the sea side and north side there is no coast except that of the island of *Irak Ozáb*[18]. The back of *Jazar Farsán*[19]§§, and the unclean places are on the side of *Irak Ozáb;* towards the east side lies the back of the island *Rakab*[20]; the most eastern of all is the island *Jozián*[21], from thence *Borrassli*[22] is in sight. There is a small

1 حول 2 حولا 3 ذوقصار 4 مقمر 5 هديقه 6 باقل 7 مسد 8 جهان الكبير
جزا 14 شرجه 13 جزرفرسان 12 امريه 11 ساسوه 10 جهان الصغير 9
عرق عزاب 19 جزرفرسان 18 صيل مطحن 17 ذوسلاب 16 ذوخراب 16
براصلي 22 زيان 21 ركب 20

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* Howali ? on Abyssinian coast, 16° 30′, can hardly be intended.

† Rasher ? below Camaran; the R. may be miswritten for K. (See p. 449).

‡ Ras Majarmla ? 14° 30′. } there may be small islands so called from their

§ Hodeidah Cape ? 14° 45′. } proximity to these capes.

‖ *Zebayer* islands, 15° 2′: the Z is probably a miswriting of K.

¶ *Gebel Zogar*, or *Zeghir* of map, on the 14th parallel of latitude.

** Theran ? 17° 12′. The word *Farsán* is applied farther on to the Abyssinian coast,—it is probably an error of transcription.

†† *Gorab*, 17° 10′. ‡‡ *Mutharhane*, 17° 28′.

§§ Perhaps the Cape *Jazar Farsán* which is mentioned above.—H.

bank[1] called *Akdáf*[2]. After the island *Seil al Motahan* there is nothing but sea, but on the border of the sea at the left are two sandy islands called *Fossailiát*[3]*. At their lower extremity are the islands *Jazira-i Somra*[4]† and *Zahra*[5]. Be it known that on the sea side of *Rakab*[6] is a shallow in which the ground is visible, but is eight fathoms deep. Some say that parts of it are impassable for ships; this *amariya* or shallow is called *Ork*[7] *Fossailiát;* after (south of?) the *Fossailiát* are three islands called *Júmas*[8]‡. On the sea side towards the north is a great island called *Zokák*[9]§, and on the south side a long bank, on the out side of which are the breakers[10], called *Tihál*[11]|| *Merír*[12], but the water has eight fathoms. This island and the above mentioned lie south on the sea side of mount *Ssabaya*[13]¶. From *Tihál Merír* in the direction of the sea side and towards the last is a *Mira* (shallow) called *Irki Isa* (Jesus's vein:) the shallowest water is there two fathoms and a half, and the deepest eight fathoms. All these *amariye* (shallows not to be used) are in the Arabic sea. After *Zokák* is a great island called *Maassaba*** on which are some trees; on its beginning[15] is a small ridge[16] called *Bodúr*. After *Maassaba* are four great islands, called *Bahr-ul-Kabír*, (the great sea;) the two most southerly are called *Lam*[17] and *Han*[18]: they are situated on the sea side of mount *Ssabaya;* after them is the ridge[19] *Ablaj*[20]††; on the south-west of it is a great bank[21] called *Shobi Yahya*[22]; on the north side of the island *Ablaj* is a mountainous bank, which is a long ridge, and extends till to the ridge of *Kimári*[23], and is next the island *Faraye*[24]. Between them is a *Ritka*[25]; that is to say, a rock. On the sea side of the mountainous ridge is the island *Darwísh*[26]‡‡. On the sea and north side is a bank[27] called *Helya*[28]§§, and on the north side a great island called *Shobain*[29]||||; after it the island *Múshka*[30]¶¶, and

1 شعب 2 اكداف 3 فصيليات 4 سمره 5 ظهره 6 ركب 7 عرق 8 جومس
9 زقاق 10 طپوق 11 طحال 12 مرير 13 جبل صبايا 14 معصبه 15 مطلع
16 ظهره 17 لم 18 هن 19 ظهره 20 ابلج 21 شعب 22 شعبعي 23 قماري
24 فرايه 25 رتقه 26 درويش 27 شعب 28 حايه 29 شعبين 30 موشكه

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* Wussaleat, of Capt. ELWON's map, in latitude 17° 42′.

† Simer, east of ditto.

‡ Shab el jurmah, 17° 34′.

§ Zoogah, 18° 5′.

|| Elalthaller ? 18° 15′.

¶ A mountain on the coast? Gebel Tase Sharme?

** Massuba, 18° 14′.

†† Aboo Lelf (on the shore.)

‡‡ Dorish, 18° 31′.

§§ Halli? S. of Coomefiddah.

|||| Shabbane, 18° 44′.

¶¶ Mooshka.

west to it lies the island *Shíka*[1]*, which is also a great island; on the sea side a great bank[2] called *Shob Sowaidi*[3]; on the north and land side of the island *Shíkan* is the island *Zú Shajíh*[4]†. On the western side is a shallow[5] called *Irk-ul-oyúra*[6]; next to it a segment[7] called *Kitaei Zaidi*[8]. Afterwards on the sea and north side an island called *Tajedda*[9]‡, and on the sea and north side of this a ridge[10]§ called *Zohrai Kassr*[11], and an island called *Takshef*[12]: on its sea side a ridge[13] called *Zohrai Takshef*[14]; in the neighbourhood of this are great banks[15] called *Dakhakhín*[16]. Be it known, that between the islands of *Dánek*[17]|| and *Tajedda* both are in sight, if there is no hazy weather[18]. These (of *Dakhakhín)* run down to *Danek* and *Tajedda* towards the west; from the *Dakhakhin* you see the island *Shobaz-zokár*[19]¶; these islands lie from *Dúnek* towards the coast of *Yaman*, that is to say, south, on one side of *Shobaz-zokár* is the island *Wússúl Omm Dahresh*[20]: on the land side of *Dánek* towards Syria, that is to say, north, are in some distance some segments (portions of rock[21]?) called *Ibn Saaid*[22]. The islands called *Dánek* are three: the first to the south is called *Shobaz-zokár*, and the next northern one *Khabíre*[23], on the sea side of it is a segment[24] called *Omm Moen*[25], north of which lies *Dánek*, the greatest of all; round it are four banks[26]. On the land side is a passage between them and *Dánek;* they are called *Mahdhan*[27], *Makhref*[28], *Korb*[29], and *Kebla*[30]. After *Dánek* are four islands called *Bahrez-zihár*[31]; the name of the first is *Matata*[32]**, of the second *Jodair*[33]††, of the third *Marmá*[34]‡‡, and of the fourth *Zohrai Marmá*. On the land side of them towards N. N. E. is a segment[35] called *Zeináb*[36], and here N. the *Shob Salim*, a long bank; from here towards E. S. E. are three islands in sight. After *Zihár* follow two banks and two called *Homais*[37]; north of them are no islands, but only some

[1] شيكا [2] شعب [3] شعب سويدي [4] ذ شجيم [5] عرق [6] عرق العيوره [7] قطعه
ظهرة تكشف [14] ظهر [13] ةتكشف [12] ظهرة قصر [11] ظهرة [10] تجدة [9] قطعة زيدي [8]
[15] شعب [16] دخاخين [17] دانق [18] غبار [19] شعب الذكر [20] وصول ام دهرش
[21] قطعه [22] ابن سعيد [23] خبيرة [24] قطعه [25] ام معين [26] شعب
[27] محضن [28] مخرف [29] قرب [30] قباه [31] بحر الظهار [32] مطاطا [33] جدير
[34] مرما [35] قطعه [36] زيناب [37] حميس

* Shaker, 18° 53′.

‡ Tegdah, 18° 58′.

|| Dahnac, 19° 32′.

** Mutatoo, 19° 45′.

† Doshagea.

§ Marked dangerous patches in chart.

¶ Shab Assugga, 19° 22′.

†† Jedere.

‡‡ Murrmah, 2 isl.

segments, the names of which are *Rehál*[1], *Majrádíb*[2], and *Hakan*[3]; the last lies to the land side and north to *Majrádíb;* on the western side of *Hakan* is a segment called *Magharriya*[4] above *Kaidán*[5]; after it comes *Tofiya*[6]*, after it the segment *Ssorúm*[7]†, and afterwards *Shob Kamáni*[8]‡, which is in the height *Mantaj*[9]. Afterwards *Khoshaat*[10]§ on the height of *Ssámíma*[11]‖, after it *Irk-ghoráb*[12]¶, after it *Mesmári*[13]**, which is on the height of the Black Cape, *Rásol-aswad*††. These islands are the last of the Arabian seas.

SECOND SECTION. *Of the islands on the Persian*‡‡ *coast.*

The first are those of the islands *Dahlak*[14]§§ situated south; the first of these islands is *Mokaidah*[15], afterwards *Mahlatán*[16], then the island *Zúbbar*[17], afterwards *Zúkarsh Bent Aadái*[18]: on the sea side of *Zúbbar* and *Zúkarsh* is a bank[19] called *Zúlfokáa*[20]. After *Zúkarsh* is the island *Sífála*[21], afterwards *Balaja*[22]; on the sea side of it is the ridge *Bent Tamarkass*[23]; after it comes great *Háteya* and little *Háteya*[24]‖‖; afterwards *Dozúma*[25], afterwards *Taraza*[26], afterwards *Dalikaf*[27], afterwards *Delfaidal*[28], afterwards *Nahali*[29], afterwards *Ghobári*[30], afterwards *Jadlab*[31], afterwards *Kabihú*[32]; between these two is *Makhádha Bent Antar*[33]; afterwards *Harmal*[34]; this is the last of the northern islands on the sea side; but there are some islands on the western side near the shore. After *Harmal* towards the land side, and N. the island *Rúmiát*[35], afterwards *Auwáli Bent Hatem*[36]¶¶, afterwards *Auwáli Shiira*[37], afterwards *Ssíl Kutín*[38], afterwards *Bent Alawa*[39],

صروم [7] طفيه [6] قيدان [5] مغريه [4] حقن [3] مجراديب [2] رحل [1]
مسماري [13] عرق غراب [12] صميمه [11] خشعات [10] منتج [9] شعب كماني [8]
ذوفرش بنت عاي [18] ذبر [17] مهلطان [16] مقيدح [15] دهلك [14]
بنت تمرقص [23] بلجا [22] سفاله [21] ذوالفقاع [20] شعب [19]
نحلي [29] دلفيدل [28] دليقف [27] طرزه [26] دزومه [25] حاطيه صغيره و حاطيه كبيره [24]
حرمل [34] مخاصه بنت عنتر [33] قبيحو [32] جداب [31] غباري [30]
صيل قطين [38] عوالي شورا [37] عوالي بنت حاتم [36] روميات [35]
بنت علوه [39]

* Tutteffah, 21° 0. † Serome Cliff. ‡ Cobane. § Ul Cussar Shamier.
‖ Simama. ¶ Urgo Gorab. ** Moosmaree.
†† The Cape immediately south of Jeddah.
‡‡ By *Persian* it may be presumed *Abyssinian* must be intended. Perhaps فرسان is a miscopy for حبشان *Habshán* or افريقان *African.*
§§ *Dhalac,* near *Massua.* None of the islands of this groupe can be traced by the names here given, until we come to the northernmost.
‖‖ Two large islands north of *Dhalac.*
¶¶ Howalee Huttoob and Shœrah, 16° 30′.

afterwards the island of *Dafna*[1]. This island situated on the land side and N. is the last of the islands *Dahlek*. If you proceed from *Harmal* N. E. one day and night, your course leads you to the islands of *Tahyrát**, which are seven islands, four of which are situated on the sea side and three on the land side; one of those situated on the land side is called *Delkas*[2], one *Bent Hatem*[3], one *Tastahel*[4], and one *Ráka*[5]; the three on the land side are called *Zúlkoráb*[6]; after the four islands situated on the sea side are on the north two islands, a great one called *Mosámara*[7]†, and a small one called *Korb*[8]. On the western side of *Mosámara*, as far as the eye can reach, are two great islands and sandy shoals called *Loka*[9]‡ and *Dilsak*[10]; after them is on the north a great island called *Zúlkefla*[11], and further on three islands are seen. Next to them and at some distance from the shore near *Zú'l asela*[12] is an island called *Torinbo*[13]§. After *Zúlkefla* on the sea and N. side is a small island called *Tamarshah*[14]‖, there is a bank[15] and on it a rock resembling a chair. After *Tamarshah* north is the island, little *Bár-Músa*[16]¶, which is a little round island, on which are some tombs and trees and shrubs of tooth-pikes. To the N. of it, and at some distance, is the island *Bár-Músa Kabír*[17]**, a great island on which large trees are growing; afterwards, towards the land side, in the direction of W. N. W. is an island called *Bárkat*[18]††, and in the vicinity of it a bank[19] which is called *Shobi Rúmán*[20]. From *Bárkat* in the direction of true west is an island called *Músa Maitbán*[21]. Be it known, that if one of these two islands is seen, the other is hidden; but if you pass between them, both are seen. After *Bár-Músa Kabír* to the N. is the island *Hindjodr*[22]‡‡; this is the last of the northern islands on the sea side. On the south side of these islands is a great bank called the long one[23], and after it a small one. If you steer from *Hindjodr* true west, you come to the port *Masrika*[24], which is at the height of *Sawakín*[25]§§.

[1] دفني [2] دلکس [3] بنت حطم [4] تستاهل [5] راكه [6] ذوالقراب [7] مسامره
[8] قرب [9] لوكه [10] دلسك [11] ذوالكفاه [12] ذوالاثله [13] ترنبو
[14] تمرشم [15] شعب [16] بارموسى صغير [17] بارموسى كبير [18] باركت
[19] شعب [20] شعب رومان [21] موسى ميطبان [22] هندجدر [23] شعب الطويل
[24] مسركا [25] سواكن

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* Dahrat Abbeed, &c. 18° 15′.

† Mussarmroo, 18° 50′.

‡ Locha and Undeesellec.

§ Juttat Tromba.

‖ Timershear, 18° 56′.

¶ Barmosa Segera.

** In lat. 19° 13′.

†† Barkoot and its Shab.

‡‡ Hindee Geedum.

§§ Suakin, one of the chief ports.

THE THIRD SECTION.—*Of Voyages and indications of the coasts being near.*

FIRST VOYAGE *from Bábolmandam*[1] to mount *Zokar*[2] and *Saibán*[3]*; you go first in the direction N. W. by N. half a *zám*[4], then steering N. N. W. you come to cape *Zokar*, and mount *Ará*[5] is in sight on the left side; if from *Zokar* you wish to proceed to *Kamrán*[6], and you steer N. by W. you come to *Rakba*[7]†. Here you see for the first time the island *Zasha*[8]‡. The course from *Zokar* to *Saibán* goes in the direction N. W. by which you come first to *Abauel*[9], and then to *Saibán*§, which are seen on the right. Be it known, that if you steer true west you come to *Mokaidah*‖, and if you take from *Saibán* the direction W. by N. you come to the two *Hátia* (the great and small one.) If from *Saibán* you follow the direction W. N. W. you come to *Bent Antar* and *Harmal*, which are islands of the Persian (African) coast; from *Saibán* going straight to the pole you come to *Badhiain*: from *Saibán* going N. by W. you come to the two islands *Jehán* (the great and small one), which are on the Arabian coast.

SECOND VOYAGE *from Saibán (Loheia) to Jedda.*

From *Saibán* to *Jedda* with an unfavorable wind, the voyage is performed from four inches to four inches by degrees in the following way. First from *Saibán* where the pole[10] wants a quarter to seven inches¶, you steer four *záms* N. W. and afterwards N. W. by N. If the contrary wind is very strong, the course to be steered is E. by N. and true east, or near it; if the wind is a middle one, you steer N. E. or N. E. by N. If in your measurement the inferior quadrant[11] gives an inch** and a quarter, the ship is on a spot distant seven inches (measurement) from the pole. If in this place the northern wind ceases, you may lay to or tack. If it blows a hard northern wind, you look for the Arabic coast, and go to *Badhiain*[12] or near it. On the sea side of *Badhiain* is a shoal *(amaria)*; that is to say, a place where you see the ground of the sea; with a weak northerly wind you go to *Mokammar*, or in the vicinity of it. The said islands are one near the other. If the pole is seven inches and a quarter, and the inferior quadrant seven inches††, and a strong northern breeze, you go to *Esman* and *Mesed*; and if there is but

[1] باب المندم [2] جبل زقر [3] سیبان [4] زام [5] عرا [6] کمران [7] رقبه [8] زشه
بضيعين [12] مربع تحتاني [11] جاه [10] اباعل [9]

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* Assaban of maps, off Loheia, 15° 41′; long. 42° 52′.

† Saddle island in the Zebayers? ‡ Rasher? § Or Loheia.

‖ Dhalac island. ¶ See introductory remarks, = Lat. 16° 18′.

** This should be 7¼ inches. †† Lat. 17° 6′.

little of a northern wind, you go to *Jihán* and *Ssail-ol-mathanat*[1]*. If the pole is made by seven inches and half, and the inferior quadrant wants a quarter to seven, and the wind blows strong from the north, you go from thence to *Khobat*[2], where some shoals are seen; with a little northern breeze you go to *Fossailiát*†; if the pole wants a quarter to eight, and the inferior quadrant shows six and a half, and the northern wind blows strong, you go to *Fossailiát*, where it is the best to remain, because on its sea and north side is infinite rubbish, that is to say, unclean places; with a weak northern wind you go to *Maassabah*[3]‡ or to the island *Lam*[4]. If the pole is made by eight inches§, and the inferior quadrant marks six and a half (¼ ?), and the wind blows strong from the north, you go to *Darwish*[5]‖ or near it; if there is but little northern wind you go to *Zoo Shajeeh*¶, where much precaution is required on account of the bank *Sowaidí*[6]. If the pole is made by eight inches a quarter, and the inferior quadrant marks six inches, and the wind blows strong, you go to *Dakha Khein*[7] or to the island *Takshef*[8] or near it. With a small breeze you go to *Dánek*. If the pole is made with eight inches and a half, and the inferior quadrant marks six inches** less a quarter, and the wind blows strong you go to *Dánek*, and with a small northern wind to *Hareik Semár*[9]. If the pole wants one quarter to nine inches, and the inferior quadrant marks five and a half (Lat. 19° 30′), and the wind blows strong, you come to *Hareik Semár*, and with a small northern breeze to *Báher-zehár*[10], with a small northern breeze you come to *Homais*[11], where you stop. If the pole is made by nine inches and a quarter, and the inferior quadrant shows five inches, you go to *Homais*, with a small northern breeze you go to *Ráhel*[12], or near it. If the pole is made by nine inches and a half, and the wind blows strong, you go to *Majrádíb*[13]†† or near it. With a small northern breeze you come to *Ssorúm*[14]‡‡ or near it; if the pole wants a quarter to ten, and the inferior quadrant shows four and a half, and the wind blows strong, you go to *Ssorúm*, and with a small northern wind you come to *Jedda*. If the pole is ten inches§§, and

[1] صبل المطحنته [2] خبت [3] مصعبه [4] لم [5] درويش [6] سويدي
[7] دخاخين [8] تكشف [9] حريق سمار [10] بحر الظهار [11] حميس [12] راحل
[13] مجراديب [14] صروم

* Matharhane. † Wassaliat. ‡ Massubah. § 18° 18′. ‖ Dorish.

¶ Doshagea. ** Lat. 19° 6′. Dahnak is in 19° 31′. Vid. sup.

†† Maharabi of the map, 20° 14′. ‡‡ Serome, on the coast of Elwon, or *Sarum* island of Horsburgh, 21° 9′.

§§ Lat. 21° 30′.

the inferior quadrant shows four inches and a quarter, you go right east four *zâms* towards *Jedda*, if God please. Be it known that in the sea of *Jedda* you find as you find corals in the western seas.

THIRD VOYAGE *from Saibán (Loheia) to Sawáken**.

The way in which you perform a voyage from *Saibán* to *Sawáken* is the following. From the place where the pole is made with seven inches† you proceed in the same manner, that is to say: first, if the northern gale is strong, you steer E. S. E. and S. E. by E.; if there is but little wind, N. W. by W.; but the true way from *Saibán* to *Sawáken* is by *Jedda*. If the northern wind blows strong you go to *Mokaidah*‡, and with a small breeze to *Hawateb*[1] (the *Hatyas*) or near them. Be it known, that on the sea side of the islands of *Dahlek*[2] is an *amaria* (shoal) and an *ahja*[3], that is to say, *topook*[4] or rocks which are not seen; the most remarkable of them is the *Ahja Tamerkass*[5] on which the water is more or less than three fathoms deep; great precaution is necessary in all these places. If the pole is made by seven inches and a quarter, and the inferior quarter marks seven inches, and the northern wind blows strong, you go to the *Hawateb*, with a small northern breeze to *Harmal* and *Bent Antar*[6], or near it. If the pole is made by seven inches and a half, and if the inferior quadrant shows seven inches less a quarter, and the wind blows strong, you go to *Bent Antar*; with a small northern wind to *Harmal*, or it is seen at the left hand. Be it known, that from *Harmal* to the pole or N. by W. two rhumbs and a half is a shoal *Merai Aari*[7] called *Harbobat*[8], of which great precaution is to be taken. Going along the coast and the pole wanting a quarter to eight, and the inferior quadrant showing six inches and a half§, and the wind blowing strong, you turn to *Torbet Khassús*[9] or to the north side of it: if the pole is eight inches and the inferior quadrant shows six inches and a quarter‖, and the northerly wind blows strong, you go to *Batn Hobáb*,[10] with a small northern wind to *Aantab*[11]. If the pole is made by eight inches and a quarter, and the wind blows strong, you go to *Mandel*, and with a small northern breeze to *Jein*[12] or near it. If the pole is made by eight inches and a quarter you go true west

[1] حواطب [2] دهلك [3] احجا [4] طپوق [5] احجاتمرقص [6] بنت عنتر
[7] مراى عاري [8] حربوبت [9] تربت خصوص [10] بطن حباب [11] عنتب
[12] جين

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* *Suakin* by Captain ELWON's chart lies in Lat. 19° 4′, Long. 37° 30′.

† Lat. 16° 42′. ‡ Dhalac. § Lat. 17° 54′. ‖ 18° 18.

to *Tahtíát*[1] or it is seen on the right; if the north wind is but weak you go to *Tamarsheh** or *Zúlkafla;* on the left hand at some distance are seen some islands, as *Mosamara* and *Lauká*[2]†. If the pole wants a quarter to nine inches, and the inferior quadrant shows five and a half, and the north wind blows strong, you go to *Tamarsheh* or *Zúlkafla,* and with a small breeze to *Bár i Músa ssaghír*‡. If from *Bár i Músa ssaghír* you steer true west towards the continent, you go from *Sawákor* or *Bár i Músa Kabír* to *Matiyát*[3]. If the pole is nine inches, and the inferior quadrant shows five inches and a quarter§, and the wind blows strong, you go to *Bárkat*[4] or near it; from *Hind Jodr*[5]|| true west you go to *Maserkai*[6] ¶; this port is on the upper side of *Sawáken.* If the pole is nine inches and a quarter, and the inferior quadrant shows five inches, you go with a strong wind from *Hind Jodr* to *Sawáken;* with a small breeze to the superior part of *Sawáken:* where is nothing but mountains. Mark that if in these parts you go tacking with a north wind, the rule is to hold the middle between the Arabian and Persian (African) coast, and that if you side to one of them you never attain your object. On the south side the bank *Rás-eshabak*[7]** called *Háwi*[8] is opposite the island *Tamarsheh.* On the north side the end of *Shabak* is opposite *Bár i Músa.*

FOURTH VOYAGE *from Jedda to Aden.*

The way of the voyage from *Jedda* to *Aden* is the following. If you start from *Mesmári* you go two rhumbs†† S. S. W., afterwards two rhumbs S. by W., afterwards two rhumbs to the south pole, turn then and steer S. E. by E. from thence you steer S. E. to *Zokar*‡‡. From *Zokar* you run one rhumb S. by W. afterwards S. S. E. to *Babel Mandam;* from thence one rhumb in the direction E. S. E., then E. by S. to *A'ara*[9], from thence you follow the direction E. by N. to *Adan* in *Yaman,* which is a celebrated port, and is commonly called the *Pearl Aden*[10], though there are no pearls at *Adan;* but as it is a great port, this name arises probably from its trade in pearls; in the same way you call the cocoanuts, which come from Bengal *Kabúlian,* because they come by the way of *Kabúl.* Cornelians of *Yaman* are found at *Aden* in immense quantities.

[1] تحتيات [2] لوكا (Λευκη). [3] مطييات [4] بارکت [5] هندجدر [6] مسرکای
[7] راس الشبك [8] هاوي [9] عاره [10] عدن در

* Timershear, 18° 56'.
† Dahreat Abged? 19° 54'; *Shab Barkoot* is in 19° 14'
‡ Barmosa Segere, 19° 3'.
|| Hindee Geedam, 19° 21'.
¶ Mersa Arakea, on the coast, 20° 13'.
** Ul Shebek, 18° 44'.
†† Perhaps *zams.*
‡‡ Gebel Zoogar, 14° 0'.

FIFTH VOYAGE *from Sawáken to Aden.*

The way *Sawáken* to *Adan* is the following: The voyage may be performed in two different ways. From the 180th day till about the 230th of the *Yazdajerdian* year*, (beginning with the *Naurúz*;) that is to say, from the 45th day till to the 95th day of the *Jelaulian* year, when the sea-faring shuts; the voyage begins from underneath *Shabaka*[1] and you follow the coast till cape *Márát*[2]†; from *Márát* two *záms* true east, then two *záms* E. by S., then two *záms*[3] E. S. E.; from thence turning to S. E. you come to *Saibán*; if from *Saibán* you wish to make *Kamrán*, you go true east, till you see the islands of *Kotáma*[4] and *Okbán*[5]; from thence to *Kamrán* is the *Ssáheb Darke Robbán*[6] ? If you sail from *Rakba*‡ one *zaum* towards the south pole you come to the mountain of *Zokar*§, and from thence you proceed in the same manner as it has been mentioned before.

The second way of performing this voyage is with the monsoon which sets in with the 280th day of the *Yazdajerdian* year (12th Aug.) which is the 145th of the *Jelálian*, or near it. Sailing from *Ratka*[7]|| you steer right east, because in this season the south-western winds prevail. If you do not set out below *Shabaka*, set out from above it, going between the islands and *Shabaka*, till you are passed the sea islands, little *Bár-Músa*¶ and such ones, you follow the course of true east. As soon as the islands disappear you sail S. E. till the pole is marked seven inches and a quarter; you go then S. E. by E. to *Saibán*. This is the course with a favourable wind, but if it is not favourable it is quite different.

SIXTH VOYAGE *from Zailá*[8]** *to Kujurát.*

The way of performing it is the following. After having left *Aibán*[9] and after having passed the unclean places, you steer N.E. by E. till you see the mountains of *Aden*; from thence true east, till you lose sight of the mountains of *Aden*; from thence E. by N. three or four days; then E. N. E. If you do not see the mountains of *Aden* you go N. E. by E. till the pole marks five inches††; from thence in the manner above said. Be it known, that in *Gujerát* grow indigo, ginger, cocoanuts, tamarind, and the tree *Tári*[10]‡‡, each bunch of which gives every day a pitcher of wine; there is also the *Pawn*[11], that is to say, *tanbúl*

[1] شبکه [2] مارات [3] زام [4] کتامه [5] عکبان [6] صاحب درکه ربان
[7] رتقه [8] زیلع [9] عیبان [10] تاری [11] پان

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* 7th May to 26th June. † Amarat, 18o 19′.

‡ Saddle island. § *Zoogar*, the *zám* must here be taken at one degree.

|| Trinkatah ? 18° 45′; another name for Shabak. ¶ Barmoosa.

** *Zehla*, east of Babelmandal, to Gujerat. †† Lat 13o 30′. ‡‡ The toddy palm.

trees, and a great number of *Tábau* trees *(Tuja)**, from the branches of which the bunches descend as roots; there are bats, the wings of which measure more than a yard; there is also a great number of *Zokúm* trees†, and an infinite number of parrots and apes, so that you might call it the country of apes.

Seventh Voyage *from Barbara*[1]‡ *to Gujerát.*

If you start from *Khorsaid*[2] you follow the direction N. N. E. till you come to where the measure is equal§, which has been explained in the former chapters, and from thence you proceed in the way above mentioned.

Eighth Voyage *from Aden to Gujerát.*

If you start from *Aden*, you go true east till you lose sight of the mountains of *Aden;* you continue to hold the same route a day and a night, then E. by N., till the southern wind sets in, then E. N. E. if possible, and if not, you follow the above course and go then E. N. E.; if there be little motion with the *Awelama*[3] (?) there is no harm in it; if a closer course is pursued you side to E. by N. and return from thence again to E. N. E., till the measure[4]|| is equal; in this measure *Lyra*¶ is five inches, or *Sagitta*[5] six inches, or Canopus and Lyra are equal to three inches and a half. Under this measure (height) you see in the sea frequently sea snakes, which ought to be taken care of, as it is a good sign; if you do not see them follow your way in the direction right east till you see them, and then change again your course to E. by N. till you see land. The best rule is to trust to the soundings and not to the sea-snakes, which, if they prove true, show themselves twice and thrice a day. Be it known, that sometimes in the monsoon *Damáni* the ship is thrown by the current towards the Persian shore like mount *Koholád Dabbaghát*[6]; at this time the ship finds itself in the barbarian channel; there great precaution is necessary against the whirlpools; besides this place there are such between *Gujerát* and *Sind* in the gulph *Jakad*[7]**, where the wind blows continually from the sea, and the current comes from the shore, so that waves

[1] بربرة [2] خورسعيد [3] اولما [4] مارقياس [5] سهم اول [6] دباغات [7] جكد

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* The *Bur* or Banian tree.

† Seej or Euphorbia ligularia, Roxburgh.

‡ Lat. 10° 30′, Long. 45° 10′.

§ The *kiás* or 16° 54′.

|| Lat. 16° 54′.

¶ There must be some mistake in these stars, as Lyra would have a meridional altitude of 68° 30′ and Sagitta much more. Canopus also could not be above the horizon along with *Lyra*, as in the given latitude this star only rises after Lyra sets; and it attains an elevation of 19° on the meridian.

** Point *Gigat*, at the entrance of the gulph of *Cutch*.

and contrary currents are not wanting, and a ship falling in with them runs great risk to be lost, if it is not saved by the grace of God; so it is necessary to avoid these places. You must turn from the Persian shore to the Arabian, and steer N. N. E. and N. E. by N. till you are out of reach of this dangerous place, after which you steer again E. N. E. Know that the wind of Canopus (S. S. E.) is not to be trusted till the pole is made with six inches or six inches and a quarter; the flood runs then true E. The signs of a tempest are great distress, and the summer birds called in *Yaman*, *ijám*[1], also the birds *bani safáf*[2] and *amm ul sanáni*[3]; these birds keep then to the shore, flying in the summer on the sea; sometimes you see them till where the pole is made with nine inches, (lat. 19° 54′.)

NINTH VOYAGE, *from Kashan*[4]* *to Gujerát.*

If you set sail from *Leiben*[5] you follow the direction E. S. E. and E. by S. during night time, when for the most part the northerly wind ceases. From S. S. E. there is a heavy swell; therefore it is advisable to keep the high sea; if during night time the wind diminishes and you find yourselves at sea, lay to till the wind becomes fresh again; but if it be fair, you go twelve *zám*[6] true east, return then to E. N. E. till *Sagitta* is six inches or *Lyra*[7] five inches, or *Canopus* and *Lyra*† come equally to three inches and a half. If in this height you see really sea-snakes, you follow the course of E. by N. till land is seen. If the sea-snakes are not seen, you steer true east till you see them, and return then to E. by N. The sign of the presence of the sea-snakes are great numbers of birds, as the *Sowaidi*[8] and *koráni*[9]. In some years the sea-snakes and the birds *Sowaidi* are seen on the Arabian coast. If you are leaning towards the Arabian shore, and the pole is made with nine inches or near it‡, it is guessed that you are come near the Indian land; but this is not certain, because these birds do not deserve much credit, as some years they are seen, and in other years they are not seen; sometimes they are to be seen in great numbers, and sometimes but few.

TENTH VOYAGE, *from Khalafát*[10]§ *to Gujerát.*

If you start from *Khalafát* you keep the sea till you come to cape *Fartak*[11]||, from thence you run twelve *záms* true east, then to E. N. E. or E. by N., as it has been mentioned before.

سنبار [7] زام [6] ليبن [5] قشن [4] ام الصنافي [3] بني سفاف [2] عجام [1]
راس فرتك [11] خلفات [10] كراني [9] سويدي [8]

* Kisseen on south coast of Arabia; Long. 51° 5′.

† Wrong stars, (vide supra) Dr. DORN calls Lyra *ulsalbak*, not *salbar*.

‡ About 20° N. Lat. § Maculla? || Cape Fartash, N. E. of Kisseen.

Eleventh Voyage, *from Zofár* to Gujerát.*

Setting sail from *Zofár* you go S. E. by S. or near it till you get into the open sea, into which cape *Marbát*[1]† stretches out a long way. From thence you go E. N. E. or E. by N. till you come to the *kiás*[2] (Lat. 17°) (the measurement explained in former chapters). At *Zofár* grow also cocoanuts.

Twelfth Voyage, *from Kálhát*[3] *to Gujerát.*

Setting sail from *Kálhát*‡ you follow a true eastern course till you see the sea-snakes, and if you see them, you return towards the coast, till *Lyra*[4] is marked by four inches and a half; from thence you steer true east till you come to the shore; this is the course performed with the monsoon *Azib:* but at the time of other monsoons you follow the direction E. by S. till you are come to the *kids* (measurement explained in the former chapters), from thence true east till to the end.

Thirteenth Voyage, *from Maskát to Gujerát.*

If from these ports you wish to make *Concan*[5], you follow the direction of E. by S. and east; if you wish to go to *Monembár*§, you follow the direction S. E. by E., you come then to the mount *Karata*[6], which is a famous mountain of *Monembár.*

Fourteenth Voyage, *from Aden to Monembár*[7], *(Malabar.)*

The course is the same which has been already mentioned before from *Aden* to *Gujerat*; you go on till the pole marks six inches and a half or seven inches‖; if from thence you can go tacking, you go in the direction of E. by S. or true east; if it is impossible to keep this course, your way is E. by N. till the pole is made by seven inches and half or eight inches; from thence you follow the direction E. by S. till the pole is made with six inches¶, then true east till land is in sight, which is *A'zádíw*[8]** or a place near it; you steer then towards the shore; what is meant by the inches, *assabá*[9], and the pole or polar star *jah*[10] has been explained in the former chapters.

Fifteenth Voyage, *from Aden to Hormúz, (Ormus.)*

Sailing from *Aden* in the direction true east you see the mountains of *Aden*, and if you do not see them you steer in the direction of *Dairai Bar*[11] which is E. N. E. till *Fartak*[12], from thence five *zúms*[13]††

مونیبار [7] قرطه [6] کنکن [5] سلبار [4] قلهات [3] قبای [2] راس مربات [1]

زام [13] فرتك [12] دیرهٔ بر [11] جاه [10] اصبع [9] ازادیو [8]

* Dofar, a little further east of Fartak. † Cape Morebat; Lat. 16° 50′, Long. 55°. ‡ Half way between Muscat and Cape Rasalgat. § Malabar. ‖ About Lat. 17°. ¶ Lat. 15°. ** Ajideeva near Ankola, lat. 14° 40′. †† The *zám* here must be about 35 miles.

N. E. by E.; then N. E. to *Marbáth*[1] and *Mottúka*[2], (this last is called *Janjari*[3],) from thence you follow again the direction N. E. by E. taking care on your way of the island *Hausakeya*[4]*, because on its sea-shore is a shallow; it is necessary to come forth between *Súkara*[5] and the islands *Khúr*[6] or *Múria*[7]†. After having found *Súkara* you sail five *záms* N. E. by E. then three *záms* N. E., from thence five N. E. by N. to *Mousír*[8]‡ you may see it or not; if you see it, you follow the same way till the island is left behind: from thence four *záms* to N. N. E. from whence you return to N. by E. till *Rasolhadd*[9]; from *Rasolhadd* you direct yourselves to the known *Dairai Barr*[10] till *Rás Mosandem*[11]§, from thence to the pole to *Hormúz*. The pearls for which *Hormúz* is famous are fished on the islands of *Kais*[12]|| and *Bahrain*[13]. If you wish to go from *Rasolhadd* to *Dúlsind*[14]¶ you steer E. N. E. till you come to *Pasani*[15] or near it; from thence to *Dairai Barr*[16], that is to say, E. by S. till *Rás Karáshi*[17]**, where you come to an anchor, waiting for the fishing boats with which you enter the port. The ancient pilots used to sail from Cape *Alhadd* to that of *Karáshi* in the direction E. by N. but it is better to go with the higher wind.

SIXTEENTH VOYAGE, *from Diu to Meshkáss*[18]††.

The time for this voyage is from the tenth day after the *Yazdajerdian Nawrúz* to the 60th day (7th Nov.—27th Dec.) which is to say, from the 240th day after the *Jelalian Nawrúz* to the 290th. First you follow the direction W. by S. two *Terfa*[19], that is to say, two inches, which make the poles eight inches‡‡; from thence to W. S. W. one *Terfa;* if it is the time to measure the pole (to take the height by the polar star) you take it: if it not be the time for it§§ you take the height at the setting of *Aquila*[20]|||| by the *Lyra*[21] which gives

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[1] مرباط [2] مطوقه [3] جنجري [4] حاسكبته [5] سوقره [6] خور [7] موريا
[8] مصيره [9] راس الحد [10] ديرهٔ بر [11] راس مسندم [12] قيس
[13] بحرين [14] ديول سند [15] پسني [16] ديرهٔ بر [17] راس كراسي
[18] مشقاص [19] ترفه [20] نسرواقع [21] سلباري

* Hasek of maps. † Curia Muria. ‡ Mazeira island.

§ Cape Mussendan, at the entrance of the Persian Gulph. || Kishma?

¶ Mouths of Indus. ** Kurachee on the northernmost mouth.

†† Maculla? or a place nearer Morebat? ‡‡ Lat. 18° 18'.

§§ This sentence proves that the meridional passage of Polaris was usually observed.

|||| The Arabic name of the star here translated *Aquila* by the Baron enables us to clear up the difficulty in former passages. In the description of the Arabic celestial globe by Dr. DORN (Roy. As. Soc. Trans. II. 381, the star النسرالواقع (the falling vulture) is shown to be *alpha lyræ*, or wega of the Alphonsine tables. The translation in the text, therefore, should be—" take the height of Polaris at the setting of *weya* (in lyra), i. e. of alpha lyræ.

seven inches and a half, then you steer true east to *Sájer*[1]*, the mountains of *Dain*[2]† are visible on the right; at this time of the year it is better to see them than to see *Fartak*, because the wind coming from N. N. E. is to be feared, which at this time of the year (it being winter) is much to be feared, as it raises great dust and waves. If you cannot attain *Sájer* you pass *Meshkáss;* if the polar star is seven inches and the ship at sea with a strong wind, turn again its head to the sea one or two days, according to the strength or the weakness of the wind; after the winterly wind sets in the monsoon *Azib*, and in this case you go back as much as you are come. If you start from *Diu* on the 70th or 80th day of the *Yazdajerdian* year (6th —16th Jan.) your way lies then in the direction W. S. W. till you come opposite the Cape of *Fartak*, which is the 300th day from the *Jelalian Nawrúz* or the 310th. From opposite the cape *Fartak* you go true east; if the winterly wind blows, you haul down the sails and lay to, if possible; if not, you go with as little sail as possible to get the ship free of the waves. After the ceasing of the winterly wind the monsoon *Azib* sets in, in which case you measure back your steps as much as you have gone, and this season is better than the former. Some years the winterly winds blow till to the hundredth day of the *Yazdajerdian* year, which is the 330th day of the *Jelalian* (14th Feb.) particularly from *Fartak* to *Zofár;* the signs of land being near are the birds *Dhofaik*[3] and *Koraik*[4], and of the sea beasts or fishes; the *Tabbáka*[5] and *Lezák*[6], and of the maritime plants the *Kirmith*[7], and *Kelhaf*[8].

SEVENTEENTH VOYAGE, *from Diu to Shehr and Aden.*

The course lies first W. S. W. till opposite *Fartak*, from thence true east till land is in sight; this voyage is performed within the tenth day of the *Yazdajerdian* year, and the sixtieth, that is to say, within the 240th and 290th of the *Jelalian* (7th Nov.—27th Dec.) if it is performed within the 80th or 90th day of the *Yazdajerdian* year, answering to the 310th or 320th of the *Jelalian* (16th Jan.— 26th Jan.) the course to be held is W. S. W. till the pole is six inches and a quarter or six inches, then true west. If you set out from *Diu* on the 110th day of the *Yazdajerdian* year, which answers to the 340th day of the *Jelalian* year (15th Feb.), the course to *Meshkass* and *Shehr* is W. S. W. and S. W. by W. till the pole is marked by five inches and a quarter; from thence you run true west; at your right the island of *Socotra* is near in sight; as soon as you

قرمط [7] لزاق [6] طباقه [5] كريك [4] ضفيك [3] جبال الدين [2] ساجر [1]
قلحف [8]

* Seger. † *Doan* near *Fartak*.

see it, if you are bound to *Meshkass* or *Hírídji*[1]* you steer N. W. by W. and if you intend to go to *Shehr* you steer W. N. W. till you see land; the sign of your approaching *Socotra* is that you see of the sea-plants or an infinite number of trees of the species called *Kirmith*, but sometimes you see them and sometimes not; on the coast of *Shehr* men and animals live all on fish.

Eighteenth Voyage, *from Mahâim*[2]† *and Shíúl*[3] *to the Arabic coast.*

The time for sailing from these ports is from the tenth to the sixteenth day of the *Yazdajerdian* year, which answers from the 240th to the 290th day of the *Jelalian* year; the course to be followed is W. by S. till the pole is marked by seven inches, from thence you steer true west. If you intend to go to *Meshkass*, *Shehr*, and *Aden*, the course to be followed is W. by S., till you come opposite to *Fartak*, from thence you go true west to *Fartak*, and from thence to which port you please: if you set out from the above mentioned ports at the end of the season, the direction to be followed is W. S. W. till the pole is four inches and a quarter or four inches and an eighth, from thence you steer true west to *Kardafún*[4]‡. The ports *Mahâim* and *Shíúl* belong to *Deccan;* from this country come the muslins called *Candaharians*, and those of *Daulatabád*, *Berúpútari*[5], and *Bairami*[6].

Nineteenth Voyage, *from Diu to the islands of Díb*[7], *(Maldives.)*

Steer first S. S. E. the pole being made by five inches, side towards the land in the direction of E. S. E. and S. E. by E. till you see the mountains of *Moníbár;* from thence to *Daira Barra*, till the pole is three inches; from thence to the south pole, till the *faráqad*[8]§ are eight inches and a quarter, then true W. to the island *Foyúka*[9], and the islands near it.

Twentieth Voyage, *from Daubúl*[10] *to the islands of Díb.*

You follow first the direction W. S. W. till you lose the shore, from thence to *Daira* S. W. by W. till land is in sight; from thence S. S. E. till the pole comes to three inches, from thence to the south pole and S. S. W. till the *Farkadain* (β and γ in the little bear) are marked by eight inches and a half; from thence true west to *Foyúka* or its neighbourhood. Mark what has been said above: till land is in sight steering S. W. by W., that means, that the land is at hand.

بزرالذيب [7] بيرمي [6] بروپاتري [5] كردفون [4] شيول [3] مهايم [2] حيريج [1]
دابول [10] فيوكه [9] فراقد [8]

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* *Maculla?* and *Hargiah* near *Aden*. † *Mahim*, north, and *Sheoúl*, south of Bombay. ‡ *Guardafui*, N. E. Cape of Africa, lat. 12°.

§ The *farkadain*, or β and γ ursæ minoris.

Be it known to you that in some of the islands of the Maldives the inhabitants hunt with dogs, bred to the purpose, the Orang-ootang (*Nísnaus*) and eat it. The *Nísnaus* is an animal resembling a monkey, but endowed with speech; but generally monkeys are also called *Nísnaus.* I have heard from the brother of *Janúm Hamza,* the late Intendant of Egypt, that coming one day on commercial business at the extremity of *Yaman,* to a walled village, he alighted at a house where two boys lying on the ground were crying, and that out of commiseration he untied their fetters. The master of the house, returning, laughed at it, and said, these are *Nísnaus,* which we hunt. The next day the master of the house took his disbelieving guest with him, and he saw the *Nísnaus* hunted by dogs. Some *Nísnaus* emerge from the sea, their flesh is a great dainty; that they are endowed with the power of speech is even recorded in the books of philosophers.

TWENTY-FIRST VOYAGE, *from Diú to Maskát and Hormúz.*

The time of performing this voyage is from the 10th of the *Yazdajerdian* year to the 60th, (7th Nov.—27th Dec.) that is to say, from the 242nd day of the *Jelalian* year to the 290th; but you must continually go tacking, because the wind which is at this time of the year the monsoon *Azíb,* blows very strong; if it is impossible to pursue your course tacking, you must wait till the wind grows favourable, in which case you go till the Lyra[1] (?) is made by three inches and a half, and the land is at hand; because the interior pole is near the Arabian mountains; from thence you proceed true west to *Saatarí*[2]*, or its neighbourhood. If you set out on the 110th day of the *Yazdajerdian* year, which is the 340th of the *Jelalian* year, (7th Feb.) your way is W. N. W. till the pole is eleven inches; from thence true west till to *Tíb*[3], or its neighbourhood; but if you set out on the 150th or 160th day from the *Yazdajerdian Nawrúz,* which is the 15th or 25th of the *Jelalian* year (26th March), then you proceed W. S. W. and S. W. by W. till you see the island of *Socotra:* direct your course then towards the north pole till *Hausakia*†, from thence to *Daira* (E. N. E.) towards the Arabian coast; if the wind grows strong before *Socotra* is in sight, the western wind *Kús* you proceed tacking to N. W. by N. or N. W. or N. N. W. as you can till you see *Mottuk*[4], *Khúr*[5], or *Múria*[6]‡. If these places are not seen, you must take care of *Ghabbai-tín*[7]§. In order to avoid it, you put the head of the ship to the sea and go on. The sign that you

غبهتين [7] موريا [6] خور [5] مطوق [4] طيب [3] سعتري [2] سلبار [1]

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* *Swardi,* near Muscat. † Hasek. ‡ Curia Muria. § Cape Isolette?

are near *Ghebba* is, that the water grows yellow; as soon as you see signs of land being near you must be in guard against it, till *Madreka*[1] or *Massíra*[2]*. If the pole is ten inches and a half, and land is not in sight, and no signs are seen; you have passed the Arabian shore, and then you have no chance but to steer for the Indian continent. You follow the direction E. by S. till the pole is ten inches to *Mangalor*† or *Soománát*‡ or *Shúrowaur*[3] and *Gúlinaur*[4]; but take care not to bring the pole to ten inches and a half, (22° 18′) in which case you necessarily come to *Jaked*[5]§ which is your damage and repentance too late. God be your guide! What is said of Indian whirlpools is all a tale, except the whirlpools in the gulph of *Jaked*, and in the Barbarian channel near *Kardafún*, where ships falling in are unavoidably lost; the causes of it are the heavy waves, the strong winds, the currents and the breakers of the coast, so that it is impossible for the ship either to hold the sea or to land on the shore, if God does not grant his particular grace. If you guess that you may be drifting to *Jaked* you must take before hand your precautions and endeavour to reach from the coast of *Makrán* either the port of *Kalmata*[6] or *Kawáder*[7], or *Kapchi Makrán*[8]; *Bandar Kawauder*‖, is the place where cocoanuts grow; or you must try to go to *Karaushi*¶ or to enter *Khúrdiúl Sind*[9]; that is to say, the port of *Lahore*, to get rid of the fear of *Jaked*. In Sind are a great number of liver-eaters, against whom you must be on your care; because if they meet a man who eats his dinner in public, they have the talent of eating up his liver with their eyes, and so kill him. This is not to be slighted.

TWENTY-SECOND VOYAGE, *from Cambeya to Aden at the end of the season.*

Cambeya is the district in the province of *Gujerát*, comprehending the ports of *Ahmedabad* and *Patan*; from thence comes the cotton of *Patan*; and *Bahâder* and some Indian stuffs. In this country is a profusion of *Babaghúri*[10] and cornelians: but the best of the last are those coming from Yaman. If you set out from *Cambeya* and come to *Diú* or its district, you must sail at night, because at the end of the season the wind blows from the west during the day, but during the night from the shore; with this land breeze you go as far you can towards the south. In some years the wind is a strong north western in the place of the *Maurara* (sea-snakes), then your course is

كوادر [7] كلمته [6] چكد [5] كولي نار [4] شوروار [3] مصيره [2] مدركه [1]
باباغواري [10] خورديول [9] كپجي مكران [8]

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* Mazeira. † Mungrole, 21° 30′.

‡ Somnáth, Choorwaur, and Cooleynorky Pagoda.

§ Point Gigat, or Juggut, at the south-west corner of the Gulf of Kutch.

‖ One of the three Bunders on the coast of Gujerát. ¶ Korachee.

S. W. by W. Your measure (height) be the pole and no other, till the pole marks five inches, then you go W. S. W. till the pole is four inches and a quarter or four inches and an eighth, then true west to *Kardafún*. The signs of *Kardafún* being near are the birds *Karík*[1] and *Manji*[2], but few are seen of the last, those which are the most frequent are the *Dagh\u00e1t*[3] and *Kasl\u00e1*[4]; of sea animals you see the *T\u00e1bb\u00e1ka*[5] (tortoise?) and sometimes the sea-horse; as soon as land is again at a distance these signs vanish: it is also probable that the birds here seen are those of Socotra, *Samaha*[6] and *Dorz\u00e1n*[7]. God knows the rest. If at this time of your course *Socotra* is on the north, you direct yourselves to *Hadiai Socotra*[8], and if you go to *Kardafún*, your course is along the *Persian** continent. If you go from *Hejr\u00e1t*[9]† to *D\u00e1rzin*[10] you steer W. N. W. and if you wish to go from *Mít*[11]‡ to *Aden* you steer true west till *Aden* is in sight, then you follow the current, *m\u00e1jri*[12], till *B\u00e1b M\u00e1ndam*.

Twenty-third Voyage, *from D\u00e1b\u00fal§ to Aden*[13].

If you leave *D\u00e1b\u00fal* at the end of the season, you direct yourselves W. S. W. till the pole is four inches and an eighth, from thence true west to *Kardafún*.

Twenty-fourth Voyage, *from K\u00fawwai Sindab\u00far*[14]†† *to Aden.*

If you start from *K\u00fawwai Sindab\u00far* at the end of the season, take care not to fall on Cape *F\u00e1l*[15], because it is five inches and a quarter on the pole; steer therefore W. by S. till the pole is four inches and an eighth, from thence true west.

Twenty-fifth Voyage, *from Henn\u00far*[16]|| *and B\u00e1udaklaw*[17]¶ *to Aden.*

If you leave those two ports at the end of the season, go from *Az\u00fadi\u00fa*[18]** or *Ang\u00fali*[19] side-wards, and then turn to the sea true west, if the wind be favourable; if not, direct yourselves W. by S. or W. by N. your utmost being S. W. by W. If you cannot attain any of these directions, turn and steer to the pole till the wind grows favourable, then turn again and steer W. by S. till the pole is made by four inches and an eighth, so you come then going true west to *Kardafún*: the vicinity of Cape *Fawl* is known by the quantity of birds and a

[1] كريك [2] منجي [3] داغات [4] كسلان [5] طباقه [6] سمحا [7] درزان

[8] هديه سقطره [9] هجرات [10] دارزين [11] مبط [12] مجري [13] دابول

[14] كوهسنداپور [15] راس الفال [16] هنوز [17] بادقلا [18] ازاديو [19] انگولي

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* African. † Harjieh? ‡ Mette, west of Guardafui.

§ South of Bombay, lat. 17° 45′. || Honawer on Malabar coast, 14° 15′ lat.

¶ Bhatakuli or Betkuldrúg, ditto, 14°. ** Aujídeeva, off Ankola, lat. 18°.

†† Probably *Cotuale Sonderbaut* of Arrowsmith, north of Goa.

great quantity of *Kálháf*[1] that is to say, *sea foam* and *Kerhet*[2], or sea trees.

Twenty-sixth Voyage, *from Calicút to Kardafún.*

If you sail from *Calicút* with a favourable wind, steer W. by S. and sometimes W. S. W. so you come to the island *Kolfaini*[3]* ; if at this time, that is to say, on the 140th day of the *Yazdajerdian* year, which is the 5th of the *Jelalian* (March), the sea shuts, the flood runs at this time N. N. W. from thence you direct your course to the south pole, and go tacking if the flood runs to the south pole, but if the wind falls lower, then this course to S. W., S. W. by S. and S. S. W. you may follow it a day and a night without inconvenience. If it should fall yet lower, turn and steer to the north pole or near it, particularly if the pole is made by less than three inches (lat. 10°), because it is profitable to be then high north, and the wind grows favourable ; if it be already so, you run from *Calicút* till *Kolfaini* two *záms* in the direction of W. by S., then eight or nine *záms* W. S. W.† then you may rejoice, as you have got clear of the islands of *Fúl,* from thence W. by N. and W. N. W. till the pole is four inches and a quarter, and then true west to *Kardafún*. *Calicút* is famous for its pepper plantations : its Prince is the *Sámerú*‡ who is at war with the Portuguese. On these coasts are a great number of elephants employed in dragging ships, launching them into the sea, and similar doings.

Twenty-seventh Voyage, *from Diú to Malacca.*

Leaving *Diú* you go first S. S. E. till the pole is five inches, and side then towards the land, till the distance between it and between the ship is six *záms ;* from thence you steer S. S. E., because in the neighbourhood of Ceylon, the sea runs high, the further you keep off the more quiet the sea grows ; you must not side all at once but by degrees, first till the *furkadain* (β and γ in the little bear) are made by a quarter less than eight inches, from thence to S. E. till the *farkadain* are seven inches and a quarter, from thence true east at a rate of 18 záms, then you have passed Ceylon. The sign of Ceylon being near is continual lightning, be it accompanied by rain or without rain; so that the lightning, of Ceylon is grown proverbial for a liar. After having passed Ceylon you go E. N. E. and E. by N. till the pole is made by two inches, from thence true E. till to the island of *Sarjal*[4] which is one of the *Nájbári* (Nicobarian) islands. After having left it behind you steer E. by S. till land is in sight, you go along it to the islands *Falúsanbílen*[5]§ which are nine islands ; from thence to

فلوسنبيلن [5] سرجل [4] كلفيني [3] قرمط [2] قلحف [1]

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* Calpeni, one of the Laccadives.

† This course is the "nine degree channel" through the Laccadives.

‡ Shah Amir ? of the Bider or Ahmedabad dynasty, A. D. 1505—49.

§ Pulo Sambelan or the "nine islands" on the Malay coast, lat 4° 5'.

the south pole. At your right some islands are seen at a distance, so you go towards the south pole till you come to the islands to *Folodjomra*[1]* which appear near, from thence E. S. E. where the sea is more than ten fathoms, if it be 11 or 12 never mind, because after 12 is the deep sea, and you are clear of the *Shob Kafaussi.* You go till mount *Folúpásalár*[2], is opposite, N. E. till the soundings give 24 fathoms, because there is a bent *sháb*[3] running out in the sea, which is to be taken care of—wherefore your course must be followed always in a depth of 24 fathoms till you see the mount *Folúpásalár* N. N. E.; then you steer towards the land and *Dairai-barra* (E. N. E.) till Malacca. The inhabitants of *Shuli*[4]† (?) go from *Falúsanbîlen* two záms to the south pole.

Twenty-eighth Voyage, *from Diú to Shátijám*[5]‡, *i. e. to Bengal.*

Sailing from *Diú,* your course, till you have left Ceylon behind you, is the same as the above mentioned, then you steer N. E. Ceylon remaining on the western side; then N. E. by N. till you come opposite to *Rakanj*[6]§, where the pole is made with a quarter wanting to nine, and the *Aselli* scarce with six inches; if in this course you see land it is well; if not, steer E. N. E. till the pole is nine inches and a half, so you come to the island of *Dardiw*[7]. If you see it at this time it is well, if not go right east till you see land, but take care of *Fesht Hayumiún*[8]‖, which is a desert rock, round which the water is twenty fathoms deep; take care also of *Dardiw*¶ where the water is but five fathoms. If *Rakanj* is in sight, go N. N. W. with 25 fathoms of water. At this time *Hayumiún* remains on your right, of which great care is to be taken. After having passed it you approach the land till your soundings give 16 fathoms, and with this course you come to *Dardiw;* after having left it behind you go with 12 fathoms depth N. N. W., there you come to a great *Khúr*[9] (?) called *Bákál*[10]**, and then five capes which are taken for islands by those who don't know them; then comes a *Ghobba*[11], that is to say, a gulph full of shallows, shoals and breakers; this place is called *Kákar Diwá*[12]††, then you come to the island *Zenjiliu*[13]‡‡ which is facing

[1] فلوجمره [2] فلوپاسلار [3] شعب [4] طايفهٔشوليان [5] شاطيجام [6] ركنج
[7] درديو [8] فشتهيومیون [9] خور [10] باكال [11] غبه [12] كوكرديوا [13] رنجليا

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* The Arroas islands. Mt. *Parcelar* is a well known land mark on the coast, lat. 2° 50′.

† The Sholas or Marhatta traders?

‡ Chittagong, once a place of great trade.

§ Arrakan, lat. 20° 10′.

‖ Probably Oyster island, a barren rock off Arracan, or St. Martin's reef.

¶ Probably *Nardiel* or Narkol deap of Horsburgh, off the *Tek Naaf* entrance.

** Probably *Mascall* island.

†† Cutub-deep, south of Chittagong.

‡‡ There are now no islands seaward of the Chittagong coast to which the sailing directions of Sidi will apply: but Lieut. Lloyd, of the Indian Navy, who has surveyed this line, informs us that there is a long shoal called "the patch," parallel with the coast, which is nearly dry at low water, and may have formed the islands of Zenjilia three centuries ago; for there have evidently been great changes in these parts, even in the memory of our own navigators.

you, your way lies N. N. W. When you approach this island, side to the sea, because its southern cape is ***rikk***[1], that is to say, a shallow, and the colour of the water grows white; meanwhile, on the sea side it is seen green. Hold that course, and you'll find better soundings by degrees till you come to 17 and 18 fathoms. Coming to this place you find the water again whitish, these shallows are on the south side of ***Fesht Gúrián***, which is a desert place: here the sea is noisy, don't keep either too near to the island of ***Zenjilia***, nor too far from it, but steer a middle course; if the soundings give 18 fathoms or near it, you have passed *Zenjilia*; then you go in the direction of the north pole, and continue to take soundings till you come to seven fathoms; from thence you steer in the direction of the north pole, and to the rising place of the β and γ of the little bear, till your soundings are six fathoms but not less. So you come to cape *Khúr** which is *Shátijám*. Here you stop till the *rebbán*[2] (tide) come, with which you enter the port. Bengal is abundant in ivory and ebony; the finest muslin turbans, the very best *jutár*[3]†, and most precious Indian stuffs come from thence; the finest muslin sashes are called ***malmal***[4], and the most precious of them ***malmali-sháhi***, which by confusion is generally named *marmare-sháhí* (royal marble); there are also sea-bulls[5], the best of them are found between Bengal and Delhi in the interior lake; they are called ***sea bulls***, although they don't live in the sea, but in the interior lakes on the land; but the merchants call them so; for in the interior northern lakes, in the mountains of the Afgháns, are also found the rhinoceros (*Karkadán*[6], the name quite the same as the *Krokotos* of Ctesias), but their horns are but two palms long; it is related that those which are found in Abyssinia have much longer horns. Girafes are found but in Abyssinia and never in India.

TWENTY-NINTH VOYAGE, *from Malacca to Aden.*

Starting from Malacca you go first along the coast till to the mountain ***Folúpásalár***[7]; there you take care of the above-mentioned bank[8]. This mountain is seen in the direction E. by S., and on some distance you see ***Folúdjomar***[9]; after having left it behind you your direction is that of the north pole till you come to the islands ***Falúsanbílen***‡, from thence you steer for some time N. N. W. till you come to the islands ***Firak***[10]§ and *Yaflúbotof*[11]‖, from thence W. by N. till to the island *Nájbán*[12], from thence W. by S. till the ***farkadain*** (β

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[1] رق [2] زبان [3] جرتار [4] ململ [5] کاوقطاس [6] کرکدان [7] فلوپاسلار
[8] شعب [9] فلوجمر [10] فیرك [11] یافلوبتف [12] ناجبان (Nicobars)

* The word ***Khúr*** used here and elsewhere seems a corruption of the Bengáli term ***khál***, creek or estuary.

† *Choutar*, a fine cloth, so called from its four threads.

‡ Pulo Sambelan of the Straits.

§ Probably *Pera* on the Malay peninsula, or Penang?

‖ Pulo Bouton.

and γ of the little bear) are made with a quarter less eight; from thence true west, Ceylon being in sight at the right; if you don't see it, continue nevertheless your western course till to the Maldives, and from thence to W. N. W. siding a little to N. W. by W. till opposite *Kardafún,* and till the pole is made by four inches and an eighth, from thence true west till you reach the land.

THIRTIETH VOYAGE, *from Shátiját́m, (Chittagong,) that is to say, from Bengal to the Arabian coast.*

Sail at the end of the *madd* (flood), that is to say, when three quarters of it are passed, and go then with the ebb W. by S. two zâms, the soundings being six, seven and eight fathoms; weigh the anchor as soon as the flood sets in and go to the wind, weak or strong, till the ebb begins again one zâm W. S. W. then two zâms N. W. The water grows then black, and you direct yourselves S. S. W. till the *Farkadain* are made with eight inches less a quarter, from thence true W. Ceylon being in sight on your right, you continue true W. till to the Maldives, and from thence to *Kardafún* in the way above mentioned. The measure of the stars (the taking of the height) and the distance of the inches has been explained already.

II.—*Extracts translated from a Memoir on a Map of Peshâwar and the country comprised between the Indus and the Hydaspes, the Peucelaotis and Taxila of ancient geography, by* M. A. COURT, *in the service of Mahá-rája Ranjít Singh.*

I.—ON THE PROVINCE OF TAXILA.

The space lying between the Indus and Hydaspes was first known to the Greeks under the name of *Taxila:* whether as its ancient local title, or one given by the soldiers of ALEXANDER from the town of the same name, afterwards its capital, is uncertain*. STRABO says that the native kings assumed the name on mounting the throne; and we find in history ALEXANDER obliging OMPHIS, who governed the country, to take the name of TAXILES. The appellation is quite unknown at the present day.

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* Col. WILFORD identifies the *town* of Taxila with the *Tacsha-sila* of Hindu ancient geography, of which the extensive ruins were supposed by ELPHINSTONE to be traced at Manikyala. The *Tacsha Sáila* or *Syâla* tribe are still numerous in the Panjáb. They state, the former name of their city to have been *Uda-nágari.* (As. Res. VIII. 42.) There is deposited in the Asiatic Society's collection a large manuscript map of the Panjáb compiled by Col. (then *Lieut.)* WILFORD from the route and compass surveys of a native, MIRZA MOGUL BEG, expressly instructed by himself and employed from 1786 to 1796, in travelling and collecting materials to illustrate an account of ALEXANDER's progress; the account however does not seem ever to have seen the light, and it is probable that the map has thus suffered oblivion. It is considerably fuller than M. COURT's Sketch, and as might be expected from the Compiler's learning, more correct in the orthography of names. We regret not having collated the two before lithographing M. COURT's map.—ED.

It appears that the Greeks confined Taxila proper to the central part of the region between the Indus and the Hydaspes; for when they passed it, the northern portion was ruled by chiefs independent of OMPHIS, while the south was in open opposition to both ALEXANDER and his ally.

The geographical limits of Taxila are well defined on the map, by the two rivers and the chain of *Pirpanjál* on the north;—from this range to *Kosháb* on the south it measures 120 kos, with a breadth from *Attok* to the *Jelim* of 74 kos*.

It seems probable that the original inhabitants were Hindus of the *Pandava* race, and *Chandra-vansís*. With these were amalgamated Persians, Scythians, and even Greeks; for the *Ghékers*, of whom so much has lately been written, I take to be the descendants of the Macedonian colonists;—they themselves trace their ancestors to the *Khaiani* race of Persia, but the word seems but a corruption of *Greek*.

Taxila contains the traces of a number of ancient towns of which the origin is now unknown. Massive walls of stone masonry are seen, and in some places brick work of Babylonish dimensions. The inhabitants call them the ruins of temples of *Deva Nagari*† or *Sita-Ráma*. The most curious, however, are the mausolea, cupolas, or topes. In the northern provinces are found colossal statues of plaster, marble, and stone, most of which have been mutilated by the bigotry of the Muhammedans. Smaller idols are also occasionally dug up of superior execution: some I have remarked with frizzled hair. The ancient religion of the country was Buddhistic. The worship of Bacchus, or the Sun, prevailed at the time of ALEXANDER, and traces of it are visible in the names of towns, as *Surya, Sita*, and *Causalya;* the sun, his daughter and mother (?)"

The present inhabitants, being of so mixed an origin, betray striking varieties of character and manners. The Musulmans who border the Hydaspes resemble perfectly the Hindus of the *Panjáb*,—while those on the east bank of the Indus have all the peculiarities of the Afgháns, whence they are descended—an elegant figure, pleasing features, and vivacity of expression. They are loquacious like the Persians:—and though living in servitude, they retain their national pride, and submit only to the authority of their chiefs, with whom they live on terms of equality. "I have everywhere witnessed their courage and intrepidity, in their encounters with the Sikhs, on whose bayonets they rush sword in hand. Against the Hindus a fierce and implacable bigotry is kept up among them by their *Mullas,* whom they regard with superstitious reverence. They retain many traits of hospitality: are blunt, coarse in manner, and devoid of the polish of the Persians. Their dress is a long shirt, blue turban and scarf, which serves the secondary purpose of a cloth to pray upon. Their women are allowed comparatively much liberty, but do not abuse it: they perform as usual the whole labour of the household, while the men are in the fields. Their houses are constructed of mud roofed with timber, and again covered with earth to keep off the rain. The tribes of the plains, having a fine fertile land, are in good circumstances; but those of the *Putwár, Thenni,* and *Khibbi* districts are sadly oppressed by the Sikhs. The mountain tribes along the west bank of the Hydaspes are in a half savage state. Most of them live only by plunder and robbery, and think as little of cutting a man's throat as a sheep's. Travelling alone amongst them is most hazardous.

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* Col. WILFORD's map states that the *kos* of this part of the country varies from 10 to 22 furlongs, probably 2 miles will be a fair average.—ED.

† Doubtless the *Uda-nágari* of WILFORD; see note to page 468.—ED.

"The language of Taxila proper is the Hindustaní corrupted, which pervades the Panjáb: in the north, *Cashmerian;* and on the Indus the *Pashtú* dialect, peculiar to the Afghán tribes. The Persian is little used, except among the informed classes.

"The principal towns in the southern division are *Rawel Pindi, Jèlam, Pínd-dádan Khán, Nillé, Fatehganj, Khibbi,* and *Makhade*:—in the central division, *Attok, Khampur, Iskanderpur* and *Noachir*:—in the northern, *Muzafferábád, Birrh, Pakkheli,* and *Kaka Bamba.*"

M. Court describes minutely the whole of these and other remarkable places, repeating under the head of *Manikyála* the account of his interesting operations upon the *topes* there, which was published in the Journal for 1834. We have lithographed his sketch of the principal tope opened by M. Ventura and his ground-plan of the place (Plate XXVI.) to shew the situation of the numerous ruins with which it is studded, and which he considers to be the sepulchres of ancient kings. The following explanation refers to the figures on the plate:—

1. Chief Cupola explored by General Ventura, (J. A. S. 1834.)

2. Cupola whence were obtained the coins and relics described by M. Court in the same Journal for 1834, p. 556.

3, 4, 5, 6, 7. Ruinous topes of which the foundations have been dug up.

8. Cupola in which M. Court found an urn enclosing a glass prism.

9. Cupola wherein was discovered a box containing a bit of ivory.

10. Small mound whence were dug up fragments of bronze images.

11. Cupola which contained an urn of baked clay.

12. Square buildings attached to many of the Cupolas.

13. Tombs.

14. Mound from which were extracted many medals of copper and of caracoly (a compound of gold, silver, and copper.)

Pl. XX. represents what M. Court denominates a "symbole," also found among the extensive ruins of this curious place. We do not find it particularly described, but, from the general appearance of the sculpture it may be regarded either as a Buddhist or a Mithraic monument—probably the frame of some picture or shrine of a temple: and it is peculiarly interesting from the collection of symbols in the upper horizontal line, almost all of which can be recognized as belonging to the series of ancient coins about which so much has been written. The jar, the *swastica,* the sun, the altar, and especially the penultimate object on the right hand, which is common on the Kadphises coins.

All the country commanded by the elevated summit of *Manikyála* is much raised above the plain of the Panjáb. It appears to have been anciently a vast plateau, that in the course of ages, from the gradual action of periodical rains combined with occasional earthquakes, has been cut into deep ravines now difficult to traverse, which make it look like a heap of ruins. It is covered with villages, the inhabitants of which raise a thin and precarious crop on its very poor soil. The neighbourhood of the mountains is covered with a thorny and leafless jungle.

The whole district is called *Potwár;* it was formerly very populous, as at least testify the numerous ruins of old habitations. The villages are said to have run into one another, forming a continuous line for 16 kos from *Manikyála* to *Tammiák.* The mulberry and other fruit trees used to thrive in its gardens.

The ruins of *Ramma* are at 13 *kos* S. S. W. from *Manikyála:* they are attributed to Sitá Rami (?) Those of *Parvala,* traced to the time of the *Pandavas,* are on the north at 12 kos. At the latter place, in the gate of an old castle, is an inscription in an unknown character.

Traces of a very ancient town, *Dangèlí,* are met with 14 *kos* towards the east: the inhabitants ascribe its origin to the *Diws.* It flourished under the *Ghiker* sovereigns, who resided there. *Makkyala* near *Kattas, Benda* and *Pakhi* were also *Ghiker* towns. The modern town of *Bégram* is five kos lower down than *Dangèli.* It is now inhabited by *Chandra-vansis,* who are descended from the former rájas of the country.

In the neighbourhood of *Jelim* (a modern town of the *Peruzan* zemindars) are the extensive ruins of another castle perched on the top of an artificial mound, where very old Hindu medals are found.

The inhabitants assert that a city surrounded it called *Bidad-nagar*; which through the wickedness and cruelty of the *rája* was destroyed by an earthquake,—a fact borne out by the appearance of the mound. This hillock had been in generations past dug up in search of coins and relics. The walls were of brick, very massive and large: there were two or three reservoirs and some wells within the enclosure, one built of stone. The Cashmerians for twenty-five years have been in the habit of digging here, nominally for bricks, but evidently from their eagerness they have fallen upon more valuable spoil: the chief of *Jelim* has several times confiscated pots of copper and silver coins thus dug up. The greater part of these have a horseman on one side and a bull on the other*. At one time a number of squared blocks of red granite were dug up, and some door posts which have been since converted into objects of worship by some *Udásí faqírs* on the banks of the Hydaspes. One of them is sketched in fig. 2 of Pl. XX, and is seen to be the door post of a Hindu temple†. The fellow of it is set up at *Khallih,* three kos N. N. W. of Jelim, by some *Ben-bába* faqirs. M. Court imagines this spot to have been the site of Bucephalia; and he would fix Nicea at *Patti-kuti* near *Vessa,* three *kos* E. of Jelim. In his opinion *Jelim* and *Aurangábád*‡ are the only positions in which two numerous armies could have encamped to dispute the passage of the river. Moreover, not a vestige of an ancient town is to be found on the west bank of the Hydaspes from *Kala Mangala* to *Dárapur,* except at *Sultánpur,* where the river debouches from the hills. In face of this spot is the fortress of *Kala Mangala,* attributed to Rája Sarwan. The opposite bank is too broken for Porus to have manœuvered his chariots. Below *Sultánpur,* at the small hill of *Barúti,* the inhabitants assert a bridge of boats formerly existed. Two kos further down, at *Menar,* are seen the remains of a castle of very great antiquity: the river once washed its walls, but has now retired half a league. It is accounted the customary place of crossing the river in former days.

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* This description is insufficient to determine whether they are of the Azos group, or whether of the Rajput series; but as they are called above, *Hindu,* we presume the latter must be the case; and this will account for the large quantity of these coins procured by Keramat Ali and Mohan Lal in the Panjáb. It may also account for the inscription *Sydlapati* on one series of them—"lord of the *Sydlas,*" whom Col. Wilford fixes as the people of Taxila, (see above.) —Ed.

† Capt. Burnes describes a *fluted* pillar with a capital very like the *Corinthian* order shewn to him by M. Court. He says also, that the inscription on the slab was in the Arabic character. Travels, i. 58.—Ed.

‡ Erroneously written *Uzengabad* on the map:—and *Morungabad* of Wilford.—Ed.

M. Court recognizes the place of Alexander's passage at *Khilipatan*, where is still the principal ford. It is five kos from *Jelim*, the Bucephela of our informant: agreeing with the passage in history, "Alexander wishing to pass the Hydaspes, ascended four leagues higher up than where he had encamped, and there crossed his army at an island which facilitated the passage." This island is the one in face of *Khilipatan*, for at the village of *Gitiali* the river divides into two branches, one running towards *Jelam*, the other towards *Sukchandpur*. They enclose a large plain of cultivable ground. The western branch is only fordable in November, December, and January: it divides again into two branches at *Khilipatan*, thus forming several large islands, the largest being two leagues long by one broad:—the river beds are pebbly, and the current strong. The plain continues for four kos up to the ruins of *Patti Koti*; and here, doubtless, Alexander must have had his encounter with Porus' son, and with that prince himself, who came to his aid. All that Plutarch says of the passage and of the towns founded by Alexander, tallies well with the above explanation.

The celebrated fortress of *Rotas*, now unworthy of regard in a military view, presents little beyond Muhammedan tombs and mosques in its ruins. There are, however, Hindu medals found there, but the particular class is not mentioned.

Pind-dáden Khán, a modern commercial town, is the great mart for the rock salt of the mountains on the west, now monopolized by Ranjit Singh*. Other ruins of an ancient town, *Gagirakhi*, extend along the banks of the Hydaspes from near *Jelálpur* to *Dárapur*. On leaving the district of Pind-dádan Khán by the route which traverses the salt range, the site of an Indian annual pilgrimage occurs, called *Kattas*. Here again are the traces of an old town ascribed to the *Pandavas*, where are found small images of a red stone, holding in their hand the *toppa* of the Persians,—a species of iron club which would appear to have been a weapon of offence formerly in use. Alexander was wounded by one in his attack on the fort of the Malli.

The district of *Thenni* bordering upon that of *Pind-dádan* is famous for its breed of horses and mules. After passing *Chekuvál*, *Nilli* and *Dula* on the *Suban* river, a ruined castle is pointed out where the sovereigns of old used to keep their treasure. Medals are here found in the ruins. The whole country is indeed remarkable for the number of antique ruins it presents: the most striking are those of *Tatta* and *Ris:* those of *Kounda* are attributed to rája Hoddi (?).

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* See the description by Burnes in his Travels, vol. i. 52, and in the Journ. As. Socy. ii. 365.—Ed.

At *Jend,* 12 kos from *Khébbi,* towards *Kushálgarh* is a small gold-washing. *Fatehganj,* a very old town, is remarkable for its sulphureous springs: *Hassan Abdál,* for its picturesque situation and pure waters: the remains of a palace built by Akber here are still visible: it is on the high road from *Attok to Lahór.* Of these places it is unnecessary to speak, as they have been fully described by Burnes and other travellers; nor have we space to extract M. Court's notes on *Khanpúr, Skanderpúr, Naucher,* &c. Near the former place General Ventura opened several cupolas, and a large one at *Páhler* was explored by the native chief.

Of the district of *Pakhéri,* called by Forster *Pukholi,* this author would make Peucelaotis of the Greeks. This M. Court refutes, placing it (as noted in the memoir published last month) near *Bajore* (Bazira of the Greeks) on the west bank of the Indus.

We must also take but a very cursory view of M. Court's remarks on the physical geography of Taxila, hoping to see the whole published ere long in the Paris Journal, with the advantage of the comments of savans acquainted with the ancient history of the province.

The mountainous tract to the north of the district boasts the boldest and most romantic scenery. It is the link between the *Pirpanjál* range and the *Hindu-koh.* In the winter months there are but two or three passes practicable for foot passengers, and that with much hazard. Parallel ranges of less elevation occupy the southern face of the principal mountain ridge for a space of 40 to 60 *kos,* forming between them the successive valleys of *Kakabamba, Pakkhéri,* and *Mozufferábád.* Detached and irregular mountains and ridges cross the main chains at various angles, or form insulated groups, as is shewn on the map. There seem to be two principal lines of upheavement, which it would be abundantly curious to examine geologically on the principle of contemporaneous origin of parallel ridges started by M. Elie de Beaumont. The most interesting lines are the metalliferous hills N. W. of the Hydaspes, in general low, savage and uncultivated, but rich in ores. •Ferruginous, sulphureous and saline springs are plentiful, but are not now turned to more use than the mines, which were apparently worked in former times. The Hydaspes formerly paid tribute in the gold of its own tributary streams. The Pinddádan chain has abundance of iron. At *Karengéli* near *Kattas* are mines of antimony:—in the *Gulrih* range, native sulphur: near *Makhodi,* native alum: and at *Pind-dádan,* the salt mines before mentioned.

The vault of the large salt mine fell in shortly after the visit of M. Jacquemont. The section shews well the position of the salt, which is, in fact, a solid rocky mass : towards the upper part it divides into veins of white and red :—the latter are preferred; the former containing lime and gypsum.

The western mine is greater in depth, but less extensive than the other. 250 steps were counted before reaching its focus :—the shafts were only wide enough for one person to pass at a time, each carrying a flambeau. The excavation is divided into two vaults ; one is now abandoned, being cut away to a dangerous precipice.

The lamps rendered the air and heat nearly insufferable when Messrs. Wade and Murray visited it in company with M. Court.

On the surface of this chain are scattered large blocks of gypsum, worn as if by the action of the sea. Some yellow slates are also seen. Vegetation is confined to saline plants and a few thorny bushes.

Of the Indus and Hydaspes sufficient is already known. Danville has fallen into an error in making the former pass by *Hashtnagar*, which lies on a small tributary called the *Jind*.

The climate of Taxila embraces extremes, from the healthy bracing cold of the snowy mountain to the excessive heats of the southern plains. The soil of the southern portion for want of water, as well as from the presence of salt, is little adapted for cultivation, and the villages are consequently very scant. In the beautiful valleys to the north, however, plentiful springs and a rich soil produce the opposite effects of fertility and a dense population ; but agriculture is neglected through the oppression of the Government. The perpetual verdure of the hills to the north affords abundant pasturage for cattle.

II.—ON THE PROVINCE OF PESHA'WAR*.

Peshâwar, the city, supposed by some geographers to be Peucelaotis, of the Greeks, is said by its inhabitants to be built upon the ruins of the ancient *Baghram*. In dimensions it certainly much surpasses *Câbul*, but its suburbs and the number of gardens which extend southward, contribute towards this apparent magnitude. Its houses are slightly built of brick or mud, held together by wooden frame work. This mode of building has, perhaps, been adopted on account of the earthquakes, which are frequent, but seldom very serious. The houses are generally provided with *Sard-khânas*, a description of cellar or underground room, where the inhabitants spend the day, to avoid the intense and scorching heat of their summer. The streets are narrow and irregular, and present every where the most uncleanly aspect.

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* In this part of the translation, which follows the original more closely than the foregoing, we are indebted to the same fair hand, to which we were beholden on a former occasion.—Ed.

A large bazar runs across from east to west, commencing from the *Serai Gaur katra,* and terminating at the fortress of *Balasir.* A stream which draws its waters from the river of *Bahréh,* crosses the town from south to north, and would very much facilitate the establishing of fountains, if the Asiatics only knew the use and advantage of them. The population of *Pesháwar* may be rated at 80,000 souls, consisting of Afghâns, Kashmerians, and Indians. The latter appear to have been its primitive inhabitants; but although they are still very numerous, they live in dependence on the Mahomedans, and are oppressed by heavy taxation, (taxés d'avanies.) All the commerce of the country is in their hands. From *Cabul,* raw silk, worsted, cochenille, jalap, manna, asafœtida, saffron, resin, simples, and both fresh and dried fruits—all which are generally exported to India, from whence they receive in return, cambric, silks, indigo, sugar, and spices. To *Cashmir* the exports are gold sequins, gold and silver thread and lace, in transit from *Bokhára;* and the return, shawls, tea, and Persian manuscripts. They exchange the salt of the *Kohát* range with the rock crystal and the iron of *Bijáwar:* this last district, as also those of *Sawát* and *Bunír,* offer a ready market for the sale of their tissues of cotton;—the trades and arts of the town are limited to mere necessaries of life, and are principally carried on by the Cashmerians.

The Hindustání is generally spoken, also the *Pashtu;* the use of the Persian language becomes nearly extinct on entering this province. *Pesháwar* musters about 40,000 horse, a thousand foot soldiers, and twelve pieces of cannon. The troops are very irregular, and are badly paid.

The climate of the province is not very healthy. Fevers are very prevalent from the summer solstice to the end of autumn, at which period they generally prove fatal. They are brought on by excess in the eating of fruits, or by the unwholesome exhalations and vapours, rising from the rivers of the *Duáb.* The irrigation necessary for the cultivation of the Turkish corn in May, may contribute to engender fever, the heat of the air being then very intense. The inhabitants, ignorant of the superior properties of quinine, make use of a very bitter plant which grows on the banks of their streams. In 1835 I was encamped in this country with the French brigade, 10,000 strong, when we lost by these fevers upwards of a thousand men. Great inconvenience is also here experienced from swarms of flies, which prevent any nourishment being taken during the day; for if any of them be swallowed with the food, they occasion a vomiting, attended with very severe pain in the loins and in the chest. Snakes and scorpions are also in great abundance, and are often venomous.

The spring sets in early: by the end of February the peach trees blossom luxuriantly; by the end of April the weather becomes unpleasant; and the heat is scorching during the months of June, July, and August. In June the *Simum* prevails; it is sometimes pestilential, resembling the desert blast *(Samial)* of Arabia. When it blows, one would fancy that one stood at the entrance of a hot oven. "Heaven pity then," the poor traveller, who is overtaken by this wind at midday in the open country! When first attacked the body becomes covered with blue spots, and putrefaction is almost instantaneous. This wind generally blows from W. N. W., in the direction of *Jelálábád,* where it is frequently fatal. The hot season ends in September. The rains are heavy in the winter, when the sky is frequently clouded for a week together. There are intervals of rain also in April, but rarely. In July and August, the rainy season in India, little falls in these parts, but storms are very frequent, and very severe, and are always preceded by whirlwinds of dust, obscuring the atmosphere for hours together; they are brought on by the S. W. winds, and are accompanied by claps of thunder in rapid succession. The lightning falls with fearful flashes.

The environs of *Peshávar* exhibit little else but a vast space covered with ruins and tombs. I discovered and dug out several remains of Indian statues. These statues, some of which are in plaister, others in bronze, appear to be of very ancient date, for they are devoid of beauty and are ill executed. They principally represent *Gauraknáthí faqirs,* or perhaps *Jogis,* who for a long time held the country west of the Indus. The image represented (in Plate XXVI.) was dug out of the village of *Banamarí,* which lies west of *Peshávar.* At a greater distance are the ruins of *Pirigèl,* where in the rains Indian and Bactrian medals are to be found. To the west of *Peshávar* is a mount upon which an ancient castle appears, which may be the one that HEPHÆSTION besieged, and which was re-established by TIMOUR SHAH, and was subsequently sacked by the Sikhs. The Sikhs again rebuilt it in 1834, when this province fell into the hands of RANJIT SINGH, in consequence of a victory gained over the Afghans by the division under my command. The gardens which stretch from the south to the west of the town present the appearance of a forest of orchards, where they cultivate the plum, the fig tree, the peach, the pear, the mulberry peculiar to this country, the pomegranate, and the quince: but these fruits, although beautiful to the eye, are very far from having equal flavour with those produced in the south of France. The grape is only cultivated at the village of *Shèkh Imám Mehdí.*

Peshäwar is situated in the middle of a vast plain, which stretches towards the N. E., and which is twenty-five kos in length from the east to the west, and fifteen in breadth from the south to the north. The mountains of the *Kattiuks,* and the *Afrédís* bound it to the east, and those of *Kohát* on the south. To the west it is bounded by the mountains of the *Kheibars,* and to the north the river of *Nagumán* separates it from the districts of the *Duáb* and of the *Yusafzais.* This plain is crossed by the river *Bahreh,* which has its source on the southern side of the *Koh-sufèd,* crosses the Kheibars, enters this district at *A'lam-gújar,* and after a short passage empties itself into the *Nagumán,* seven kos east of *Pesháwar.* Without it the district would be nothing but a barren desert. From June to September the river is dried up by the many drains made to irrigate the cotton plantations and the barley fields. The principal water-courses strike off at the village of *Serband,* and are divided lower down into an infinity of lesser ones, which give astonishing fertility to the soil of this district, and promote the cultivation of rice, which is principally sown in the village of the *Múshtúrzais,* and is much prized by the inhabitants of *Afghánistán,* and the *Panjáb.* The river *Nagumán,* which I presume is no other than the Malamantus of the Greeks, formerly ran to the west of *Pesháwar,* and you may still trace its bed near the ruins of *Rasheki.* It appears that some sovereign of the country must have changed its course, in order to fertilize the land of the *Mumunds,* which extends to the south of the town. This tribe, as well as that of the *Kaleels* who inhabit the west, have often bloody contentions for the water. The districts of the *Dáúdzais* and of *Kalessa* are watered by the canal of *Budèní,* led from the same river of *Nagumán;* its waters are so favorable to vegetation, that grass grows on its banks to the height of a full grown man. The territory of *Pesháwar* is, generally speaking, most fertile, rivalling the best in Europe if it were but well administered. The harvest is gathered in the summer, and again in autumn. That of the summer yields an abundance of barley and corn,—that of the autumn several kinds of maize, rice, oil seeds, and abundance of cotton, which provides the inhabitants with a species of manufacture suited to the climate. Wood is procured in great scarcity from the surrounding mountains, on which very little grows.

This country on every side presents to the view ruins of ancient towns, of the very origin of which the natives are ignorant. The most striking are those of *Khohusser,* more commonly known by the name of the *Takkal,* where are the vestiges of three massive cupolas, of very ancient date. Not far from thence are the ruins of *Rachekhi.* Further off the remains of the town of *Jamrud* may be observed at the entrance of the defile of the *Kheibar* mountains. The route from *Peshávar* to *Michiní* betrays signs of old habitations* at *Pirbala* and *Pessank.* The road to *Kohát* presents also the remains of *Boulidana,* which may possibly be Embolima of Alexander. Quite close to this, *Deliter* may be seen; and further off, at the entrance of the defile of the *Kohâts,* are the ruins of *Kargan, Akor, Zendán;* and in the districts of the *Múmunds* may be also seen those of *Aspínagar, Bassevanan,* and *Ormúl.*

The province is divided into six districts; namely, the *Kaleels* to the west, the *Múmunds* to the south, the *Dáúdzais,* the *Duáb* to the north, the *Kalissa* to the east, and that of *Hashtnagar* to the north-east. These several districts yield a revenue of eight lakhs of rupees, without including the cantons of *Kohát* and *Lachiteri,* which bring near two additional lakhs. The district of *Kohát* is inhabited by the *Bungeish,* and is celebrated for the beautiful springs of limpid water which meet at the foot of the surrounding mountains. A coal mine exists in this territory, but the inhabitants derive but small profit from it. A mine of sulphur is also to be found there, but it is not worked; and some petroleum wells or mineral tar, which the inhabitants use to light up their dwellings. Adjoining to this pergannah are the districts occupied by the *Theris,* and beyond this is the province of *Banúták.*

The district of the *Duáb* is so called, because it is enclosed between the two rivers of *Nagumán* and *Jindi.* It is very fruitful in rice and sugar-cane, and abounds in beautiful and fertile meadows. It is inhabited by the tribe of the *Cigiánees.* In the district of the *Abázais* are the ruins of *Gound,* but their origin is not known. Still further in the direction of *Tengi* is the isolated mountain of *Azarneh,* which might well be supposed to be the Aornus, the conquest of which was one of Alexander's most brilliant exploits. The fortress of *Hissár* is only ten kos to the N. E. of *Peshâwar:* it is situated three kos from the river of *Nagumán,* in an island formed by two branches of the river *Jind,* which flows from the outskirts of *Sawát* and *Bajáwar.* This fortress is conspicuously raised on a small artificial hill. At its foot are extensive ruins of an ancient town, apparently founded by idolaters, and upon which is built the actual town of *Hashtnagar,* a name meaning the seven towns*. Our geographers think that this town is the same as *Massaga*, the capital of the *Assaceni*, but I am more inclined to think that it is the *Nysa* of the Greeks. Its proximity to the Cophenes, and above all what PLUTARCH states as said by ALEXANDER to his Macedonians, when they objected to fording the river on account of its depth, corroborate my conjecture. The inhabitants of the *Duáb*, and those of the mountains of the *Mourmards*, appear to me to be the Assaceni, who were employed by ALEXANDER in building the vessels, in which they sailed down the Cophenes as far as Taxila. To the N. E. of *Hashtnagar* is the mountain of *Behhi* standing alone on a vast plain, and close to it are the ruins of an ancient castle which is attributed to *Rajya Varrah*, and which, according to the traditions of the inhabitants, was the dwelling of the ancient sovereigns of this country. There are also some basso-relievos, and the traces of an aqueduct by which the waters were carried to the river *Jind*. This aqueduct commences at the ruins of *Rajir*, which are situated nearly opposite *Hashtnagar*. Further off in the district of the *Babúzais*, on another mountain, are the massive ruins of another fortress, which can only be reached by means of a path cut through the rock. It goes by the name of *Peli*.

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* Hashtnagar, meaning eight towns. The whole eight are named on Wilford's map.—Ed.

Three days' journey north of *Hashtnagar* are the districts of *Sawát* and *Bunir*, where are the ruins of *Gerira*, *Bonsekhan*, *Zakút*, and *Chímkor*. Near the latter are four massive cupolas of the same kind as those of *Manikyála*. The small river *Panjkorí* traverses the district, and joins the *Jindi*. It is much to be regretted that travellers do not visit with more minuteness this portion of the country, as they might, were they to do so, gain positive information as to the march of ALEXANDER on the banks of the Indus. It is in these districts that BIRBEL, the Vizier of AKBER, perished with a whole army. The inhabitants have, we are told, cut a road through the rugged rocks, leading to the north, by means of which they communicate with the Tartar tribes of *Kashgar* and others. All that tract of country lying to the east of *Hashtnagar* is inhabited by the tribe of the *Yusufzais*. The Indus forms the eastern boundary of this district, and *Landeh* on the river *Nagumán* its southern. To the north are the mountains of *Panjitar* and *Shemla*. According to some historians, the province of the *Yusufzais* is the same as the Taxila of ALEXANDER, where the king OMPHIS reigned, whose fidelity and devotion facilitated to ALEXANDER the conquest of the Indus. But, according to other historians, and more especially in the opinion of PLUTARCH, the real Taxila was that country enclosed between the Indus and the Hydaspes.

The province of the *Yusufzais* is divided into eleven tappas—viz:

		Principal Towns.
Two tappas.......	Sedu-zais, Otuman-zais,	Hound. Toppi.
Five tappas, Rezers	Keder-zais, Mamu-zais, Malek-zais, Akukhels, Mani zais,	Khiva. Nohdéh. Yar-hosein. Ismaila. Toulandi.
Two tappas, Amazais.	Ismael-zais, Daud-zais,	Kapurdigarbí.
Two tappas, Kamalzais.	Kamal-zais, Kamal-zais,	Ottí. Túrú.

All these districts are governed by independent chiefs, who live in the greatest dissension. There are no taxes established, and each inhabitant rents, cultivates, and reaps the produce of his grounds, paying only a small sum as tribute to the chief of the district. It is only since 1822 that the Mahárája of Lahore succeeded by the force of arms in levying five rupees on every house and a certain number of horses, with which they are obliged to furnish him annually. The tribe of the *Yusufzais* is one of the most powerful in *Afghánistán.* It has always been remarkable for the independence it has preserved, and for some time it resisted the attacks of the Mogul kings, and even Nadir Shah himself, who never thoroughly succeeded in subjugating it. The people of this tribe are vigorous, active, turbulent, and have given proofs of extraordinary courage in the wars which they have had to sustain against the Sikhs. When public danger is threatened, all the districts suspend their own quarrels, and gather together to make common resistance. Each one provides himself with weapons at his own expense, and volunteers as a soldier under the banner of his chief. This soil is extremely fertile in every kind of grain, yielding a plentiful harvest of maize, beans, peas, cotton, oil seeds, and excellent tobacco. The mountains towards the north afford excellent pasture for all kinds of cattle. The province contains no town, properly so called, but it is embellished by large and populous villages: the principal one amongst them is *Kapardigarhí,* standing in the midst of the ruins of a very ancient town, which might very possibly be the Caspatyrus of the Greeks, the capital of the Gandári, whom our geographers place to the east of the Assaceni on the western bank of the Indus. Quite close to this village I observed a rock on which there are inscriptions almost effaced by time, and out of which I could only decipher the following characters. (See Inscription 5, of Plate XXVII.) Further off, on the opposite side of the mountain of *Koh-ganga,* are the ruins of an ancient town, which is attributed to a heathen race; and quite close to that is the village of *Bazar*, now inhabited by the *Kamalzais*. Not far from thence is another very extensive ruin, where several remains of statues have been found*. In the land of the *Yusufzais* also are the ruins of *Motina* near *Yar-hosein;* those of *Gagri* and *Shirkand* near *Ismaila; Kirkand* near *Mayar*, in the district of *Otti; Kaleder* near the stream of *Kálapáni; Mashari-Banda*, on the river *Landeh;* and *Pélussedán*, opposite *Messa*. Besides these ruins the country is covered with an immense quantity of small artificial hills, on which there are remains of ancient dwellings, and where, in the rains, Indian, Bactrian, and Indo-Scythian medals may be found. Near *Panjitar* are the ruins of *Nogiran*, where there are inscriptions in the same character as those noticed above.

In the district of *Shemla*, which is further to the north, we remark those of *Nágari*, where basso-relievos may be seen. On the banks of the Indus are the ruins of *Péhour, Toppí, Hound*, and *Mahmedpur*, of which I have already spoken. The river *Landeh* or *Nagumán* separates the *Yusufzais* from the province of *Katiúks*. This country is very mountainous, and contains mines of sulphur, salt, springs of naphtha, and many slate quarries. It is inhabited by the tribe of the *Kattuks* and the *Aferidis*, intrepid mountaineers, who often intercept the route from *Attok* to *Peshâwar*. Their chief towns are *Nizámpur* and *Sirrí* in the interior, and *Akhoreh* on the right bank of the *Nagumán*. This last town may be presumed to be the *Ora* of Arrian. If this be the case, the inhabitants of the mountains of the *Katiúks* are descendants of the *Assaceni*. The province of the *Kattuks* is divided from that of *Kohát* by the district of *Lachitrí*.

III.—*Facsimiles of Ancient Inscriptions, lithographed by* Jas. Prinsep, *Secy. &c.*

[Continued from page 349.]

Pl. XXVI. 1.—*Asirgarh inscription.*

This inscription, for the knowledge of which I am indebted to the antiquarian zeal of Dr. J. Swiney, has been in the possession of Dr. Mellish since the year 1805, when, according to a memorandum on the original drawing, it was copied from a wax impression of a seal found at Asirgarh by Captain Colebrooke, of the Engineers. By the three notes in pencil at the top, (which I have

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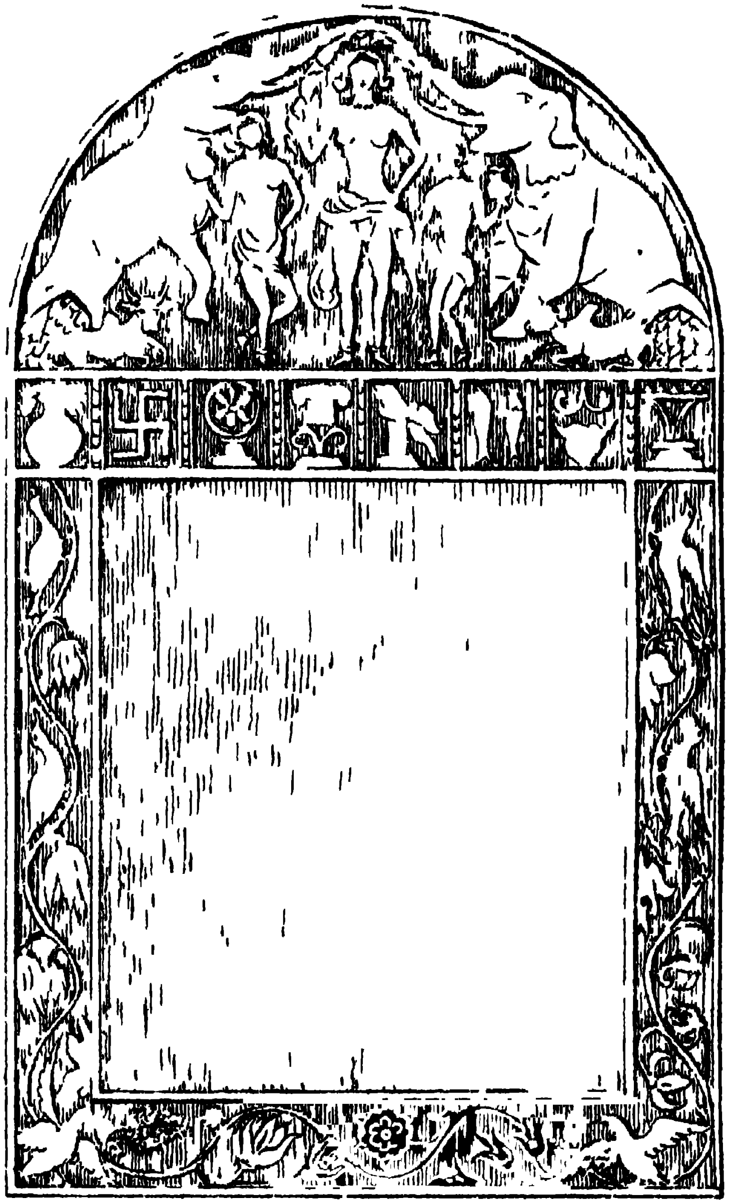
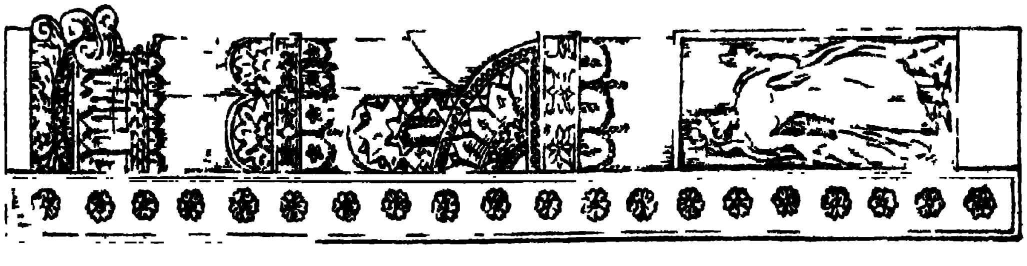
* We have lithographed in Pl. XXVI. a bronze head dug up probably at this place by M. Court. It bears a Sanscrit inscription.—Ed.





inserted), it would appear that the seal was surmounted by three series of figures, probably cast in bronze: viz. in the centre, *Nandi* the bull, with a state chatta over him, and supporters on either side, bearing, the one, a chatta and axe; the other a sceptre and axe.

The inscription, hitherto undecyphered, is at once seen to belong to the old form of *Deva-nágarí*, now grown familiar to us; and I am indebted to the Rev. Dr. Mill, for the subjoined transcript in the modern character, as well as for the translation of the text, and remarks on the same.

From the absence of a date it is not easy to assign a certain position to the five distinct successions which it embraces; though, from the locality of the inscription in a fort of *Khandésh* immediately south of *Málwá*, as well as from the termination of the names in *Varma*, they may be assigned with some probability to the *Ujjayani* dynasty; where, in the twelfth century, we find Naravarma, Yasuvarma, and three other *Varmas* recorded as having reigned. No one of these names, however, accords with any of the present list; neither does the modern Nágari of their inscriptions, of which Colonel Tod has published facsimiles, at all resemble the seal character, which is evidently of a much more ancient date. It is customary, also, in Hindu records of this nature, to commence with the reputed ancestor of the race; but we find no allusion to Vicramáditya or Bhoja in the present instance, and must either suppose our seal anterior to these illustrious personages—or unconnected with *Ujjayani*. It is certainly possible that a petty rája might have maintained independence for a few reigns in his hill fort, claiming descent from the unknown Hari-varma; but it is unlikely that he should have assumed the lofty title of *Mahárájadhiraja*.

The twice recorded matrimonial connection with the Gupta family is also worthy of remark, as it may possibly have reference to the *Canouj* dynasty, whose coins have lately excited so much interest. The style of alphabet affords strong evidence of their contemporaniety.

Transcript of the Asírgarh inscription in modern Deva-nágarí.

1 चतुस्समद्रातिक्रान्तकीर्त्तिः प्रतापानुरागापनतान्यराजः वर्णाश्रमव्यवस्था
2 मतप्रवृत्तो चक्रश्चक्रधनवप्रस्वामर्त्तो हरिश्रीमहाराजहरिवर्म्मा तस्य
3 पुत्रस्तत्पिद्वतुष्यातिजयः श्रीमतीतद्वारांकदेव्यामुत्पन्नः श्रीमहाराजादि
4 त्यवर्म्मा तस्य पुत्रस्तत्पिद्वतुष्यातिहर्षो गुप्तायजारिकार्य्यामुत्पन्नः श्रीमहारा
5 जेश्वरवर्म्मा तस्य पुत्रस्तत्पिद्वतुष्यगरिमा गुप्तायजारिकार्य्यामुत्पन्नो
6 महाराजाधिराज श्री.र.सिंहवर्म्मा तस्य पुत्रस्तत्पिद्वतुष्यातिहर्षयु
7 क्तो भारकामहर्य्यामुत्पन्नः परमहरीश्वरो म
8 हाराजाधिराजश्रीवर्म्मवर्म्माश्वरः ।

Translation.

"He whose glory was transcendent by reason of his four great goods*,—before whose splendour other kings bowed, sickened with envy,—who was ever occupied in the juridical decisions of learned Munies dwelling in leafy hermitages,—whose crooked ramparts were alike bright and impenetrable,—who was the spoiler of all such as were vexed with peace,—(such was) the great king HARI-VARMAN. His son, whose excellent victories equalled those of his father, born of his noble† wife ANKA-DE'VI', was the great king A'DITYA-VARMAN. His son again, whose exceeding joys equalled those of his father, born of ARIKA'RI'‡, eldest daughter of the GUPTA race, was the great king I'SVARA-VARMAN. His son, whose magnificence equalled that of his father, born of ARIKA'RI', eldest daughter of the GUPTAS, was the great king of kings R. SINHA-VARMAN. His son, possessed of like exceeding joys with his father, born of BHA'RA KA'MA-HARI', was the chief of the excellent lion-rulers, the great king of kings KHARVA-VARMAN, our worthy Lord."

It is observable—that the title of *Rája-adhirája,* or king of kings—is here, as in the Allahabad inscription, restricted to the two last of the line of succession—viz. SINHA-VA'RMAN, and KHARVA-VARMAN. I do not understand the simple letter R. prefixed to the former name, (viz. a र with a dot preceding and following)—unless it be an abbreviation for Rája: nor am I quite sure of the three letters following the last name, which I have made ईश्वर: W. H. M.

Inscription on a bronze image from Pesháwar.

The head depicted in Plate XXVI. is copied from a sketch in M. COURT's memoir and collection of drawings, from which extracts are published in the present and in the preceding Journal, (see p. 482.)

The characters are decidedly Deva-nágarí, but whether from their indistinctness, or from errors in the copying, or from the language being different, their combination does not form any intelligent Sanscrit sentence.

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* i. e. *Religious duty,* धर्म्म; *wealth,* अर्थ; *pleasure,* काम; *eternal salvation,* मोक्ष. Such are the four *Bhadras* or goods according to the Hindus. Amera Cosha, ii. 7, § 3, sl. 57. If, however, for स्वभद्र we read समुद्र with PREMA-CHAND Pandit, the translation will be, "He whose glory transcended the bounds of the four encircling oceans."—W. H. M.

† The ordinary honorific epithet *Srímati* is here, contrary to the usual rule, introduced into the compound in the feminine gender. Regularly it should either be the crude form *Srímat,* or the locative case feminine *Srímatyám.*—W. H. M.

‡ The recurrence of the same name and description is singular. It is impossible that they should be the same person, such incest being unknown even to the heroic age of India.—W. H. M.

The head has its hair gathered in a knot after the fashion of the Hindu devotees, and it is bound together by a triple-headed snake of the cobra species—an ornament not uncommon to Jain figures, but rarely seen in the simple head of Buddha. The ears seem to be lengthened and split, in the style of the *Kánphatí* sect; but the drawing may also be viewed as of earrings in ears of the natural dimensions.

Pl. XXIX.—*Inscriptions on Kemaon Tridents.*

On the right hand side of Plate XXIX. is depicted the bronze trident at *Barahát* in *Garhwál*, reduced from the large native drawing presented to the Society by Mr. Commissioner Traill, last winter. The inscription on the shaft was published as No. 2 of Plate IX. with a translation and explanation by our Vice-President, Dr. Mill. The copper letters being in relief from the shaft were taken off in facsimile.

The same plan, Mr. Traill says, did not answer with the trident at *Gopèsvara,* although the *ancient* letters ón its shaft are soldered on in the same manner.—The copy taken by the eye of a native draughtsman is unfortunately too incorrect to be legible: but the form of many of the letters shews clearly that this inscription is of the same age as that of *Barahát.*

On the upper part of the trident are three or four short inscriptions in the modern Devá-nagarí. These, Mr. Traill says, are cut into the metal. Three of them are illegible, or rather appear to be in some other language. One only is in Sanscrit; but in this also several errors have been committed by the transcriber. With the assistance of the Society's pandit I am able to present it in a complete form:—it contains a name—the grand desideratum in such cases; though too often, as in the present instance, it turns out to be a name unknown to fame! The verse is in the accustomed *Sárdúla Vikrídita* measure, so often mentioned by Dr. Mill. It opens with the invocation *Aum Svasti.*

उं स्वस्ति ॥ कृत्वा दिग्विजयं महाभय महादेवायसंस्थामिमां राज्ञः
श्रीमदृणेक* मल्लपतिस्तम्भश्चाग्नीतवान् ॥
पश्चाच्च प्रतिरोप्य तच्च विजयस्तम्भं प्रतिष्ठा
मगाद्भुत ख्यातप्रतिरोपणं हि महतां युक्तं गतानां पुनः ॥

"The illustrious Prince Anik Mall, having extended his conquests on all sides, brought together (quere, humbled or made low) upon this holy spot sacred to Mahádeva, under the emblem of a pillar, the very sovereigns of the world whom his prowess had overcome ;—

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* The proper grammatical reading would be श्रीमदनीक

"And thus having re-established this same pillar of victory, he acquired reputation. It is a pious act to raise up a worthy foe when he has been humbled."

'Parcere subjectis et debellare superbos' seems to be the sentiment here inculcated ; and it is probable that the allegory of overthrowing and restoring enemies, alludes to the taking down the pillar (which may have been done to cut the new inscription) and its restoration, by some rája who had penetrated thus far in a successful expedition.

The name of Mall occurs as a patronymic in more than one dynasty of Nipál. It is not impossible, therefore, that the name here written Anik Mall, may be the same as the Anya Mall of the *Neverit* race, who reigned in that valley about the year 1195 A. D. according to Kirkpatrick's Sketch. Anya, which is without meaning, should probably be written Ani'k.

IV.—*Sub-Himálayan Fossil Remains of the Dádupur Collection. By Lieuts.* W. E. Baker, *and* H. M. Durand, *Engineers.*

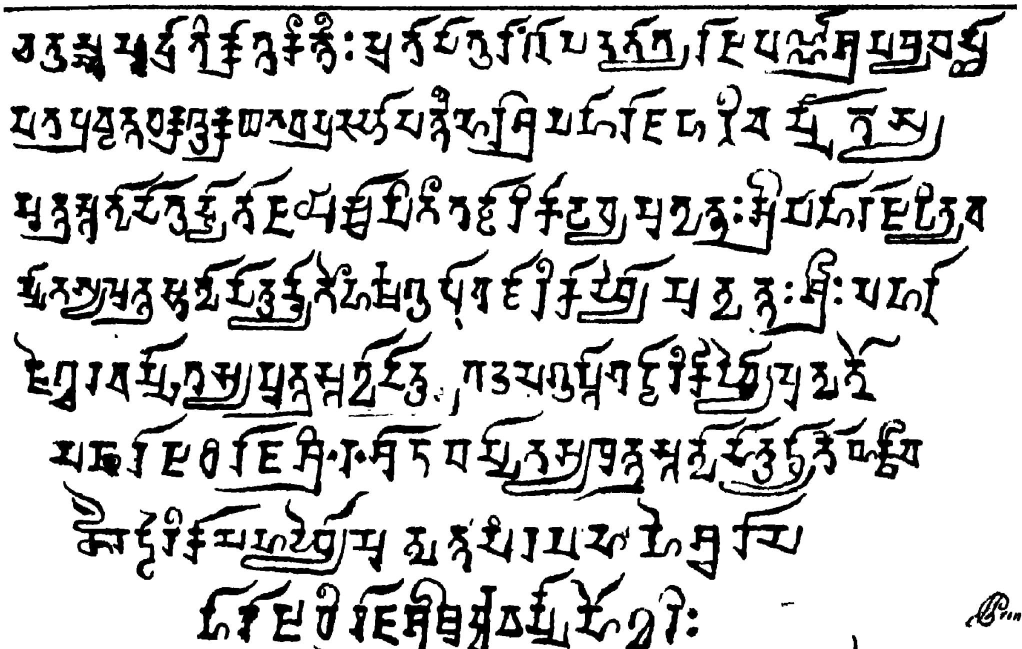
[We should be wanting both in candour and courtesy, were we not to point out to the reader, that the plates accompanying the present paper were furnished by our zealous contributors, and their esteemed commandant Col. Colvin. In despair of the difficulty and expence of executing so many plates in Calcutta, it occurred to us that the same pens and pencils which could produce such neat original drawings, could, if provided with the requisite materials, furnish engravings and lithographs ready executed for our Journal. We accordingly dispatched some yellow paper, and a copper plate, by dák, to Dádupur ; and these are the first fruits. If not quite perfect, it should be remembered that the transfers had to travel 1,000 miles in the height of the rains ere they could be secured on the stone—and that the copper-plate, with its waxed and etched surface, had to be bitten by the acid after its arrival in Calcutta. The wonder is, that they should have turned out so well ! We anticipate much greater success hereafter.—Ed.]

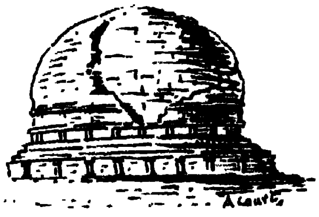
RHINOCEROS.

The manner in which the organic remains of the Sub-Himálayas were at first deposited, and that in which they have been subsequently disinterred, have necessitated a system of search more favorable to the acquisition of specimens than to the accurate description of the localities in which they occurred. Hitherto the fossils were in general found widely scattered over the surface and throughout the ravines of the calcareous sandstone formation ; a dispersion which rendered gleaning from the hill surfaces preferable to excavation at any one place, affording the certainty of a larger number and greater variety of spe-

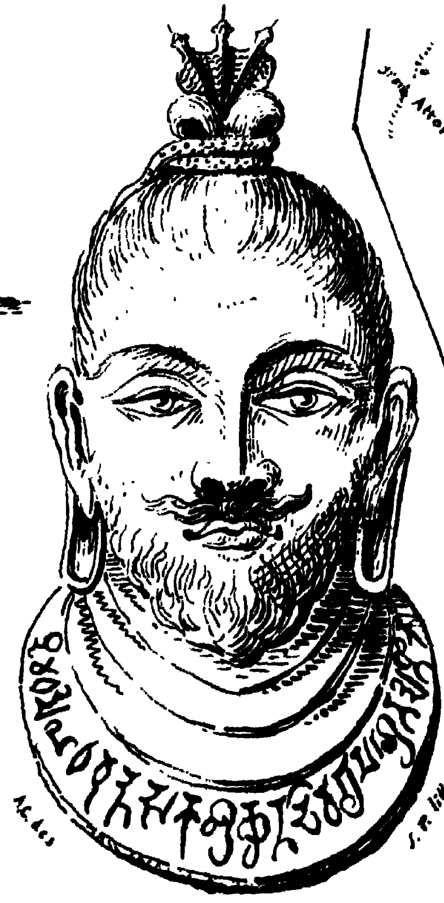
From the wax-impression of a **Seal** found at Asir-garh.
taken by Capt. Colebrooke in 1805: preserved by Dr. Mellish.

MAN WITH CHATTA AND AXE - NANDI WITH STATE CHATTA - MAN WITH SCEPTRE AND

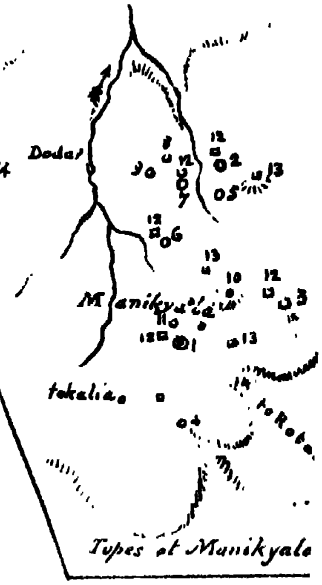




Elevation of the
MANIKYALA TOPE.

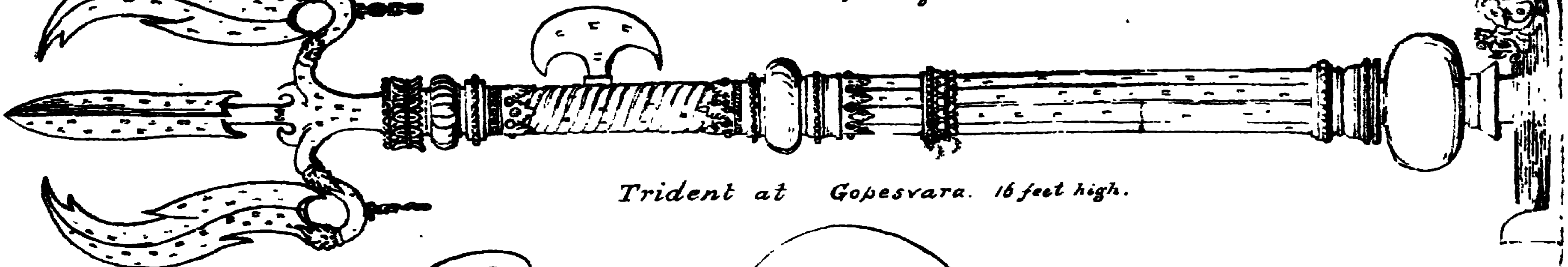


BRONZE HEAD dug up at PESHAWAR by M.A. COURT.

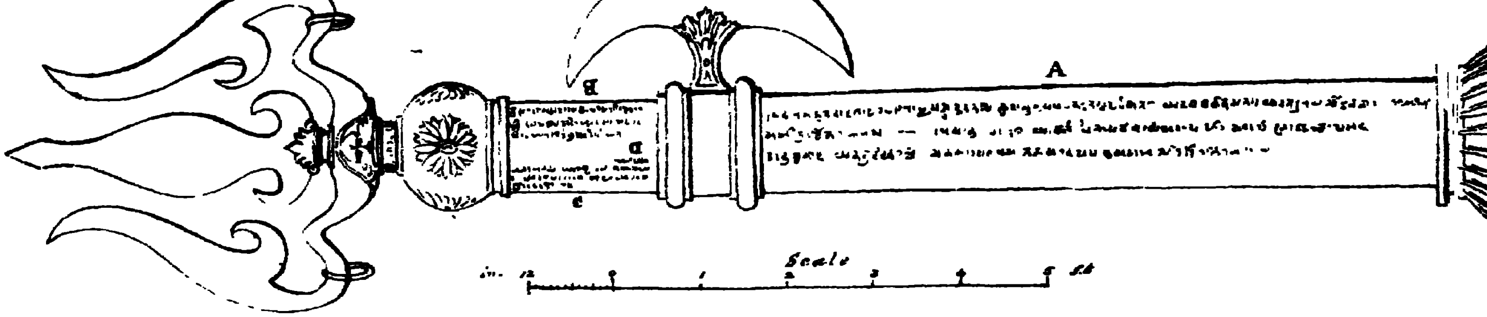


Topes at Manikyala

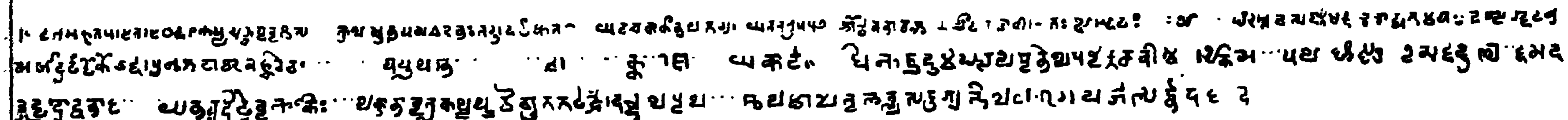
Trident at Barahat in Garhwal.
21 feet high.



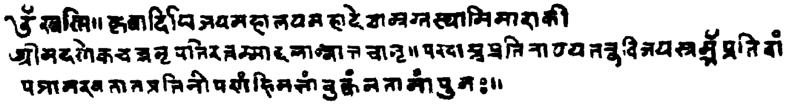
Trident at Gopesvara. 16 feet high.



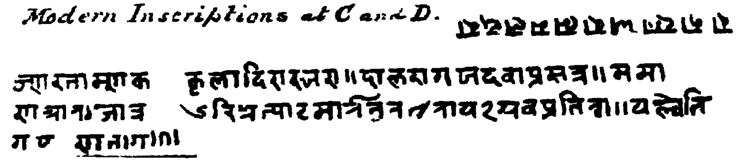
Ancient Inscription on the shaft of the Gopesvara trident, at A.



Modern Inscription, at B.



Modern Inscriptions at C and D.



J. Prinsep lith. from
Mr. Traill's native drawings

cimens than could be anticipated to result from any other mode of collection. Notwithstanding these circumstances, however, it was soon observed that the different parts of the head, the various fragments of one limb, picked up at considerable distances from each other, could with a little trouble be extracted from the heaps and assorted; the sharp edges and accurate junction of the fractured surfaces preventing any doubt or mistake. Such restorations proved that whole extremities, perhaps entire skeletons, must occasionally have been entombed in the sand, and that the upheavement of the strata causing the greater number of fossils to be traversed by cracks, divided them into a number of fragments, which, on the degradation of the strata, were swept away by the drainage water to various distances from their original sites. It became an object, if possible, to discover these sites; with this purpose in view, many of the abrupt cliffs and fresh slips, with which this tertiary formation abounds, were examined; but with such little success as to render it evident that the gradual wear of ages could alone have sufficed for the exposure and dissemination of so vast a quantity of these relics on the slopes and in the ravines of the hills. The scattered fragments were seldom found to give any clue to the original place of deposit: in fact it has but once occurred to us that a nearly entire extremity has been discovered in the calcareous sandstone. And in order to illustrate the foregoing remarks, we have appended a sketch of these remains*; the drawing represents them as they lay after the removal of the sand which at first concealed all but the lower fragment of the femur: pieces of tusk, bones, and the half of a lower jaw, were found in the immediate neighbourhood, and indicated that the other parts of the skeleton of this *mastodon elephantoides* had originally been deposited at no great distance from the posterior extremity which forms the subject of the sketch. The whole may be considered a fair example both of the mode of deposition and of the subsequent dispersion which lodged separate, sharp-edged fragments on the hill sides and amongst the sandstone boulders of the water-courses. The rare occurrence of specimens under such favorable circumstances rendering excavation a very uncertain and ill requited labour, forced the native collectors to be satisfied with the crop which time had exposed.

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* We regret exceedingly that the drawing on transfer paper of the fossil *in situ* was spoiled in passing it on to the stone. This was the case also with Plate XIX. a very beautiful drawing by Col. J. Colvin: but the latter officer having taken the precaution of forwarding its original, a tolerable attempt has been made to supply its place by M. Tassin. The initials W. E. B. to this plate have been inserted by mistake.—Ed.

Hence, too, the localities of fossils thus collected at places remote from each other did not admit of being accurately specified; a circumstance of less importance so long as the species, sometimes even the genera, exhibited characters distinct from the fossil and existing species hitherto described; but the species about to be noticed being an approach to an existing type, we consider ourselves fortunate in having witnessed the exhumation of many of the specimens referred to in this paper, and are only sorry that the limited time at our disposal was insufficient to enable us to take a plan and accurate sections of the ground.

The following general description may, however, give some idea of a locality which furnishes an exception to other places whence fossils have been obtained; in this instance they have not been met with in solitary fragments, but found massed together; and excavation has been resorted to with advantage. Though but an imperfect description, what follows may suffice to point out the site in question, and it has therefore been introduced.

The deposit is situated about a mile and a half to the N. W. of *Maginund,* a village on the left bank of the easternmost affluent to the *Caggar,* (or Gagur of some maps), immediately at the debouche of the channel from the hills. On leaving the village, crossing over to the right bank, and skirting for a short distance in a westerly direction the base of the hills, the bed of a tributary is reached, which, on being traced up, leads to the deposit. The formation here consists alternately of strata of calcareous sandstone and of strata of a loamy texture, composed of a mixture of sand and clay; the proportions of these ingredients of course vary continually, but in general they are nearly equal; the clay colours the strata, giving a brownish red shade. The calcareous matter which enters into these loamy strata is usually in small quantity, and they are so little indurated that some of the blocks, although sheltered from the force of the rain itself, fall to pieces when exposed to the damp atmosphere of a rainy day. The fossils extracted from this matrix are more fragile than those imbedded in the calcareous sand, and much care is requisite in disengaging them.

A hasty or distant view of the sections which here, as elsewhere, abound, might lead to the conclusion that the loamy strata predominate; for being, as above described, but little indurated and easily acted upon by damp and rain, they tinge the calcareous sand strata beneath them by covering their exposed sectional surfaces with red or ochre-coloured particles. The consequent effect is very deceptive; but on closely examining many sections, we invariably found the sand to predominate. The part of the hills here alluded to is barren of wood. The strata evidently suffer very rapid degradation, in consequence of the facility with which the clayey beds yield to the abrading force of the drainage water; by means of the loose stratum, the more enduring sandstone is as it were peeled off, and covers the hill slopes with its debris. The dip of the stratification has a general N. E. direction.

The circumscribed space, more immediately under consideration, consists of about one hundred feet of ravine along a stratum of loamy texture. Within this confined space specimens of all the genera, contained in the synopsis of our collection, have been found: that is to say, the same bed which yielded so many remains of the fossil unicorn rhinoceros, likewise produced the half of the upper and lower jaws of a young sivatherium; many bones of the extremities of adult animals of that genus, or of a ruminant of as large a skeleton as that of the sivatherium; the anterior half of the head of an animal which presents analogies both to the palæotherium and anoplotherium; and, in short, exemplars of all the genera excepting the hippopotamus. The remains of fish and tortoises must also be added to the list of classes not hitherto discovered in this deposit: exceptions, however, which are probably accidental, as the plates of saurian animals have been obtained from thence.

The osteological remains, although strangely amassed together, are frequently perfect; in many instances whole extremities have been disinterred; there are cases of the greater part of whole skeletons being dug out, but these are rare; whole craniums of large animals have not hitherto been met with; a circumstance which, considering the number of their bones, would be unaccountable, had we not grounds for taxing the carelessness of the excavators as in part answerable for the anomaly. Perfect craniums of the smaller animals are of frequent occurrence; in one block we counted *five* craniums of antelopes, close together; not all equally perfect, as one of them possessed even the core of the horns complete, but with the molars and greater part of the head present, so that all error is excluded. Animals of the same species are not always thus heaped together: on the contrary, the relics of very different species may be frequently observed in contact. One block of moderate dimensions presented the assemblage of remains of the sivatherium, rhinoceros, sus, crocodile, of a large feline and a small carnivorous animal, of antelope, and of an undistinguished ruminant. Another block gave the head of a species of gulo, accompanied by the plate of a saurian animal. To the rhinoceros femur and tibia, (Pl. A) we found attached the astragalus of an elephant and metatarsal of a rhinoceros: it would however be useless to mention at greater length the juxta-position of specimens in this stratum; suffice it to add, that sometimes, perhaps in general, the skulls and bones of the same species are found together; at others, however, as above described, the remains of very different species occur together.

There is one remarkable fact deserving of mention; which is, that by far the greater proportion of the craniums from this deposit are those of young animals; the adult bear a small proportion to them.

From the above site the fossils selected to form the subject of this paper have been obtained, with the exception of the following.

The cranium, Pl. XV. which was found about three miles from the Maginnud deposit.

The separate teeth, fig. 5, 6, 7, 8, Pl. XIX. which were brought at different times and without any account of the places at which they were obtained.

The fine fragment from a lower jaw, fig. 6, 7, Pl. XVI. which is in the possession of Conductor DAWE, of the Canal Department, to whom it was brought from the vicinity of the *Haripur* pass.

Cranium. We shall commence with the fossil, which being the most perfect, affords the best means of instituting a comparison with the skulls of described species. It forms the subject of Pl. XV. in which three views are given, which were taken with a camera lucida—the instrument and the distance of the cranium were so adjusted, that the reflected image was exactly one-sixth the size of the original. We are indebted to Colonel COLVIN for the delineations in this plate.

The fossil cranium is imperfect in the following parts. The extremity of the nasal and intermaxillary bones are broken off; the zygomatic arches are both fractured; the left occipital condyle is wanting; the following molars have either dropped out prior to the envelopment of the head by the matrix, or have been broken off subsequently to its fossilization, viz. the fifth of the right, the first and seventh of the left maxillary. In addition to these losses the cranium has undergone, when in the stratum, the common fate of sub-Himálayan relics, and is cracked in several directions: the crush, however, which produced these cracks has not materially altered the form of the head; the chief effect produced has been the forcing the left half palate at its anterior extremity a little above its proper level; this the longitudinal crack passing through the left orbit enabled it to accomplish; the displacement resulting may be best observed in the profile view of the skull, fig. 3. The transverse cracks are accompanied by a small hollow and a consequent neighbouring bulge, both so partial and of such small relief, that in the profile their places can only be observed by paying attention to the jagged outline at the depression of the frontals. With the above exceptions the specimen is perfect.

A glance at Pl. XV. will be sufficient at once to determine the species with which this fossil rhinoceros must be compared. The depression of the frontals causing the deeply curved outline of the upper planes of the head; the slope of the occiput; the septum and its nasal arch—all separate this cranium from the existing and fossil bicorn species. The existing unicorn species is that, therefore, to which recourse must be had in order to establish a comparison.

In the unicorn rhinoceros of Java the height to which the crest of the occiput rises above the palatal plane, as also the thickness and prominence of the nasal arch supporting the horn, are less than in the Indian rhinoceros. A line drawn tangential to the crest of the occiput and the highest point of the nasal bones will, in the unicorn species of India, be more raised above the plane of the frontals than is the case in the Javanese rhinoceros. In the foregoing respects the fossil associates itself with the Indian, and differs from the Java species. The comparison may, therefore, in general be confined to the former.

With the view of bringing at once under the eye, the discordance which occurs between the relative values of analogous dimensions, the subjoined table is here inserted. The modulus chosen is the space occupied by the seven molars, because on this measurement the development of the bones of the head must, to a certain extent, be dependent. The measurements given in Cuvier's Os. Fos. have afforded the proportions of the existing species; and the table of dimensions which closes this paper has given the proportions of the fossil.

Measurement.	Cuvier's Ind Rhin.	Fossil. Ind.Rhin.
Space occupied by the seven molars assumed equal to, ...	1·00	1·00
Height of occiput from lowest edge of occipital foramen to summit of crest of occiput, ...	1·02	0·80
Greatest breadth of occiput, ...	1·11	1·05
Least thickness of cranium across temporals, ...	0·45	0·38
Breadth across at post orbital apophysis of frontals, ...	0.83	0·78
Distance from anterior of orbit to auditory foramen,.......	1·02	1·00
Breadth across the occipital condyles, ...	0·47	0·60

Referring to the table of dimensions it will be observed, that the height of the occiput is in the fossil less by met. 0.021 than the corresponding measure of Cuvier's Indian rhinoceros; but the greatest breadth of the occiput is met. 0.036 in favor of the fossil: relatively to the space occupied by the seven molars, these two measurements attain a less development in the fossil than in the existing animal.

The difference in the occipital condyles amounting to met. 0.065 in excess of the Indian rhinoceros causes a marked discordance in the ratios of these dimensions; but, as the left condyle and the adjacent parts are wanting in the fossil, the measure was obtained by doubling what appeared to be the exact half dimension; this of course is not so satisfactory as if the condyles had been perfect; any inaccuracy consequent on this circumstance could not, however, amount to a quantity which would materially alter the deduced proportion. The occiput, figs. 8, 9, Pl. XVII. is fortunately very perfect; from its dimensions, which prove it to have belonged to a smaller animal than the cranium of Pl. XV. may also be concluded, that though inferior in size to Cuvier's specimen of the Indian rhinoceros, which in greatest breadth of occiput exceeds it by met. 0.039, yet the space occupied by the condyles is 0.010 in favor of the small fossil occiput. In both of the fossils the depressions near the summits of the occiputs on each side of the mesial projections are deeper than those of the existing species.

The zygomatic arches not being entire, and the matrix being uncleared from the portions which remain, no particular remarks can be passed on them.

The sutures cannot anywhere be traced; a circumstance which precludes the notice of particulars frequently of importance in the comparison of species.

The least thickness of the cranium is but met. 0.001 greater than that of the Indian rhinoceros; and therefore in proportion to the modulus, yields a less ratio than that species.

The breadth at the orbits is met. 0.024 greater than in the existing species; consequently the skull does not in this part present any material discordance of proportion.

The length between the auditory foramen and the anterior of the orbit is 0.043 met. greater in the fossil; this measurement affords a proportion only differing met. 0.002 from that obtained from the existing species.

The infra-orbitary foramen is situated similarly to that of the Indian rhinoceros.

The nasal arch is massive and much developed; the spring of this arch is perpendicularly over the anterior of the second molar; that is a little more retired than in the Java or Indian rhinoceros skulls, given in Cuvier's Pl. 4.

The breadth of the palate has not been given in the table of dimensions, because the first and seventh molars not being perfect on both sides, measurements corresponding to those of Cuvier's could not be obtained. It is comparatively less than in the existing species, but the great breadth of the teeth compensates for this difference.

Having detailed the essential differences and the points of resemblance observable in the fossil Indian rhinoceros when compared with Cuvier's dimensions of the existing Indian rhinoceros; we must be permitted to add, that additional measurements from skulls of the latter species are requisite before anything certain can be pronounced as to the amount of difference or correspondence between the two species. We are induced to make this remark, in consequence of having been favored with the examination of two craniums which presented considerable variation of proportions when compared with Cuvier's and with each other.

It appears to us desirable, therefore, to ascertain the limits within which individual variations range before any thing positive can be asserted. The foregoing remarks will have shown a great general resemblance, accompanied by a departure of proportions in some corresponding parts: the latter may be sufficient for the establishment of a new species,—at least for the present, until more data are obtainable whence to determine the bounds by which the individuals of one species are limited in their variations; for the sake of distinction, therefore, and present convenience, at the same time keeping in view the type to which it is a near approach, we have termed the species under consideration the *R. Indicus fossilis*.

Teeth. The remark has been already passed, that the greater number of fossils obtained from the Maginnud deposit are the remains of young animals: with the rhinoceros this has been particularly the case. We accordingly find ourselves better able to illustrate the early stage of dentition than that more advanced.

Fig. 1, Pl. XIX. represents the right half of an upper jaw, the left half being in this instance omitted, as also in figs. 3 and 4, in order that the series may be brought under the eye in one plate. Fig. 1 contains the four milk molars of the left maxillary; the fourth being but just cut is unworn; but the palate being broken away from the base of the tooth, more of it is seen than would otherwise be the case; in the right half of the specimen, where the palate is whole, the fourth molar is more concealed. The first molar is also unworn, but the second and third have suffered detrition. The two rows of teeth have their internal base lines parallel to each other, and the lines which would circumscribe their exterior much curved, in consequence of the difference of breadth which exists amongst the teeth. The upper part of an unworn tooth, measured exteriorly, is much longer than the lower; for the anterior of each molar projects beyond the posterior extremity of the one immediately in its front by the gradual enlargement of the external line of enamel from the base to the summit. As the molars wear down, this outer development is reduced, the internal sides of the teeth come more into use, and breadth is gained in compensation for the diminished length of surface in wear.

Fig. 2, Pl. XIX. is a fragment from a right maxillary, containing the 1st, 2nd, and 3rd milk teeth, more worn than the corresponding molars of fig. 1. The 1st teeth in these two specimens are dissimilar; but that of fig. 1 not having completely disengaged itself from the jaw-bone, a strict comparison cannot be made between the two. The detrition which the remaining teeth have undergone does not prevent the trace of their enamel from being found to agree with that of the analogous molars of fig. 1.

A still further advanced state of wear is figured in fig. 3, which is taken from a cranium to which the occiput and anterior of the nasal bones are wanting. The 5th molar is here on the point of appearance; the four first are much worn, particularly the first and second; but there is no difficulty in tracing the correspondence between the molars of this and of the preceding specimens.

The above three exemplars of the deciduous dentition we assign to the fossil Indian rhinoceros, from the circumstance of their having been found in company with bones the forms of which clearly pointed out the species which they must have resembled. The disposition of the molars also corresponds with that observable in the cranium Pl. XV. where the same parallelism, of internal base line and arched external bounding line, exists. To which may be added, that the frontals of the cranium to which the molars of fig. 3 belong, evince no sign of having borne a horn.

Between the worn state of the deciduous molars exemplified by fig. 3, and the worn state of the permanent molars figured in Pl. XV. we have no connecting links, excepting such as may be obtained from a few detached teeth which appear to have belonged to this species—these are,

Fig. 5, Pl. XIX. The sixth molar from a left maxillary. The spur, which occupies no inconsiderable part of the hollow between the anterior and posterior transverse hillocks, is here less curved than that of the Indian rhinoceros; and there is wanting altogether the small salient of enamel, which in the Indian rhinoceros occurs between the starting point of the above mentioned spur and the point of junction of the exterior and anterior main lines of enamel. It may also be mentioned, that the exterior and posterior lines of enamel being less thick than the corresponding parts of the sixth molar of the Indian rhinoceros, there is a greater space between the two. Such modifications of form are however fortuitous, differences of equal amount being observable in the teeth of animals of the same existing species.

This fossil measures in length,	in.	2.50	met.	0.0645
in breadth,	,,	2.62	,,	0.0675

Fig. 6. The 5th molar, derived from a left maxillary. The outline of its enamel accords with that of the similar tooth of the Indian rhinoceros, the only difference being in the dimensions and in the enamellated edge of the short beading at the anterior side of the tooth.

It measures in length,	in.	2.08	met.	0.053
in breadth,	,,	3.27	,,	0.0835

Fig. 7, is the 7th molar, and from a right maxillary; the point of the small spur is broken, as also the anterior extremity of the external line of enamel; but the tooth is sufficiently perfect to show a close resemblance to the analogous molar of the Indian rhinoceros.

It measures in length,	in.	2.88	met.	0.0735
in breadth,	,,	2.53	,,	0.065

Fig. 8, is the 7th molar of a left maxillary; the difference observable between this and the foregoing specimen consists in the great development which the small anterior spur here attains; in the former it is scarcely observable; in fig. 8 it is very prominent. Variations to an equal amount may, however, be observed in the minor saliants, &c. of enamel in teeth appertaining to skulls of the same existing species. No weight can therefore be attached to such unimportant modifications.

This fossil measures in length,	in.	2.95	met.	0.075
in breadth,	,,	2.55	,,	0.065

Fig. 5, offers a good example of the difference of length at the upper and lower parts of the tooth; the greatest length, which is that taken near the top, is given above; the least external length taken at the base would have been in. 2.04, or nearly half an inch less than the top measurement.

The cranium Pl. XV. has its molar teeth so much worn down, that the configurations of the enamel cannot be traced; the table of dimensions gives the length and breadth of each tooth, and shows that although the lengths do not materially differ from those of the corresponding teeth of the existing species, the breadths exceed those of any hitherto described.

Without complete illustrations of the milk-teeth of existing species, it would be dangerous to attempt a comparison between them and the fossil Indian rhinoceros. We have therefore avoided the endeavour;

but we must be allowed to notice the upper jaw fig. 4, Pl. XIX. which offers peculiarities when compared with figs. 1, 2, and 3 (of the same plate) deserving of remark.

The right half of the specimen is figured in the plate, the left half having lost the 1st tooth. With respect to age, this jaw nearly corresponds with fig. 3, the fifth molar being in both on the point of appearance. The following departures from the tracing of enamel in figs. 1, 2, and 3, may, however, be observed. The second molar of fig. 4 has this peculiarity,—that instead of the anterior portion of the tooth being one continuous offset from the exterior line of enamel, it only assumes that appearance after considerable detrition, consisting at first of a short offset and an isolated pillar, as shown in the drawing. The two sides of the jaw have been very unequally worn, in consequence of which the opposite side to that delineated has the pillar and offset conjoined. The third molar also presents a marked difference, when placed in juxta-position with the corresponding teeth of the other three jaws; the two spurs which occupy the central hollow of the tooth are of a different shape from that which occurs in the other specimens. In other respects fig. 4 corresponds with them—its rows of molars are parallel to each other, and the dimensions offer but trifling variations. The modifications of form above alluded to, unless fortuitous, which is perhaps improbable, denote the existence of another species; a fact corroborated by the examination of the milk molars of the lower jaws in our possession. Upon the consideration of these we now enter, but are able to offer but few and unsatisfactory remarks.

Lower Jaws. With the exception of the fine fragment, fig. 6, Pl. XVI. submitted to our inspection by Conductor Dawe, and the fragment fig. 9, the specimens of lower jaws are all from the Maginnud deposit, and all the remains of young animals.

Fig. 1, Pl. XVI. represents a fossil which has lost the anterior of its symphysis, the second molar on the right, and the first molar on the left side of the jaw; as also both the rami, which are broken off. Four molars have appeared, the second and third of which are worn, but the first and fourth have their enamel intact; the sections of fracture expose germ teeth. The two lines of molars have a gentle convergence, which is effected, not by a curve in the rows of teeth, for these are set in a perfectly straight line, but by the gradual approach of the two rows, which make a small angle with the medial line of the jaw. The section shown by the break of the symphysis and the interval between the front molars, argues the existence of a prolonged symphysis. The fourth molar is characteristic, having an isolated point or low pillar in the centre of the chord of its posterior crescent.

Fig. 5 is a fragment containing two molars, apparently the third and fourth milk ones; the outer enamel of the latter is mutilated, but the interior is perfect, and presents the isolated pillar of the posterior crescent, noticed as remarkable in fig. 1.

Fig. 4 is the right half of the lower jaw of a young rhinoceros, but of one somewhat older than the animal to which fig. 1 belonged, for the fourth molar has in fig. 4 suffered detrition. Notwithstanding the difference of age being in the favor of this specimen, the space occupied by the four molars is less than that of the four in fig. 1. The fourth molar is here devoid of the low isolated pillar in the posterior crescent, and has the central enamel, or junction of the two crescents, larger than in fig. 1. There are no means of ascertaining whether or not the opposite rows of molars were parallel, but in position of symphysis and set of the teeth in a perfectly straight line, this specimen corresponds with the foregoing.

Fig. 3 is the exterior view of fig. 4.

Fig. 2 has its fourth molar just disclosed and rising into the line of molars: it is devoid of the isolated pillar; but in size corresponds with fig. 1, instead of fig. 3, to which latter it assimilates itself by the fourth and second molars.

It is difficult to ascertain the degree of importance to be attached to such points of difference: in no specimen from the jaw of an adult animal has any trace of the isolated pillar been hitherto found: occurring as this peculiarity does in a deciduous tooth, should nothing similar take place in the permanent tooth which replaces it, the only chance of determining the question will be the discovery of an entire head. We have noticed an upper jaw, fig. 4, Pl. XIX, which indicates the probability of the existence of two species. The examination of the above lower jaws rather confirms this supposition; but in the event of such slight modifications denoting specific distinctions, we are unable, in consequence of the paucity and incompleteness of specimens, to decide which are the milk-teeth of the fossil Indian rhinoceros. Nor are we fortunate with respect to the lower maxillary of the adult animal; figs. 6, 7, and figs. 8, 9, being all that we can bring forward. The sections of these two fragments differ in consequence of their being derived one from the posterior, the other from the anterior part of the jaw, which thickens as it approaches to the symphysis. These two specimens resemble the corresponding portions of the lower jaw of the Indian rhinoceros, but are too imperfect to afford any satisfactory measurements for grounds of comparison.

Anterior Extremity.

A scapula in our possession is not sufficiently perfect to give accurate measurements, but it bears as great a general resemblance to that of the Indian rhinoceros as do the other parts of the skeleton.

The humerus, figs. 1, 2, Pl. XVII, having its radius and ulna attached, was discovered by ourselves very close to the place whence we excavated the femur and tibia forming the subject of Pl. XVIII. With the exception of the deltoid crest, this humerus is perfect, and has afforded the dimensions which enter into the first column of the table. For the purpose of comparison the following five columns are here added. The proportions of the Indian and Sumatra small species of rhinoceros are deduced from CUVIER's table; those of the fossil specimens are of course from the table of dimensions. The length of the bone is assumed as the unit, and the measures of other parts referred to it in order to obtain their comparative values.

Measurements.	Cuvier's Ind. Rhin.	Cuvier's Sumatra Sl. Sp. Rhin.	Fig. 1, Pl. 17. fossil I. R.	Fig. 5, Pl. 17. fossil Ind. Rhin.	Fig. 6, Pl. 17. fossil Ind. Rhin.
Length of humerus from tuberosity to external condyle,	1·00	1·00	1·00	1·00	1·00
Ditto ditto ditto internal ditto,	1·03	0·95	0·91	0·94	..
Greatest anter. post. diameter at top,	0.44	0·30	..	0·44	0·43
Breadth across condyles,	0·36	0·31	0·35	0.37	..
Ditto of articulating pully,	0·25	0·19	0·22	0·22	0·25
Least diam. of the body of the humerus,	0·15	0·13	0·14	..	0·15
Length of radius,	0·79	0·75	0.76	..	..
Breadth at top,	0·26	0·20	0.23	..	..
Ditto at bottom,	0·25	0·18	0.23	..	..
Length from articulating head to bottom of internal condyle,	..	..	0.82	0·61	0·87

The Sumatra rhinoceros (small species) concurs with the fossil Indian rhinoceros in having the length taken to the external condyle longer than that taken to the internal. The Javanese and the larger Sumatra species also accord with the fossil in this respect, but not so nearly as the small Sumatra species, which has consequently been introduced into the above table.

The length of the fossil humerus, figs. 1, 2, Pl. XVII, exceeds that of any of the existing species: its thickness is, in proportion to the length of the bone, intermediate between the Sumatra and Indian species. The articulating pully also possesses a development intermediate in value to those of the two existing species. The breadth at the condyles is in the same proportion or nearly so as that of the Indian rhinoceros. The radius is in length, considered with reference to length of femur, a little less than in the Indian and somewhat in excess of the small Sumatra species; the remaining two dimensions of this bone yield values intermediate to those of the two existing rhinoceroses. These remarks apply to the deductions for fig. 1; nor would it be necessary much to alter them in speaking of fig. 5; but fig. 6 presents such a close approximation to the Indian rhinoceros, that it is much to be wished that the specimen had not been so broken as to prevent additional measurements from being derived from it. Excepting in the length from the articulating head to the bottom of the internal condyle, it does not much differ from fig. 5. The bone, however, being imperfect, must be omitted in drawing a comparison between the fossil and existing species.

Fig. 1, varies most from the Indian rhinoceros in the proportion of the length taken to the internal condyle; an anomaly difficult of explanation. We must here repeat, that there exists a necessity for a greater number of tables of dimensions taken from the skeletons of the Indian rhinoceros: the anterior extremity of a rhinoceros, with the examination of which we have been favored, yielded proportions so nearly corresponding with those deduced from the fossil humerus, figs. 1, 2, as to prevent our drawing more positive conclusions than those expressed at the close of the remarks on the cranium, Pl. XV.

Posterior Extremity.

The femur and tibia, Pl. XVIII, were dug up in such close proximity to the humerus and radius, fig. 1, Pl. XVII, that little doubt could be entertained of their having belonged to the same animal. Being perfect,

Measurements.	Cuver's Ind. Rhin.	Fossil Pl. 18.	Fossil 3d in table of dimensions.	Fossil 5th in table of dimensions.
Length of femur from articulating head to bottom of internal condyle,	1·00	1·00	1·00	1·00
Breadth from head to most salient part of great trochanter,	0·38	0·43	..	..
Breadth across condyles,	0·29	0·28	0·26	..
Antero. post. diam. of internal condyle,	0·34	0·34	..	..
Ditto ditto ditto of external ditto,	0·27	0·26	[illegible]	..
Distance between bottom of 3rd trochanter and top of 1st,	0·59	0·61	..	..
Ditto ditto ditto small trochanter and top of head of femur,	0·46	0·41	0·46	0·42
Diam. of articulating head of femur,	0·18	0·19	0·16	0·17
From lower side 3rd trochanter to bottom of external condyle,	..	0·38	0·38	..
Length of femur from articulating head to bottom of 3rd trochanter,	..	0·72	0·71	0·64
Length of tibia from anter. tubero. to anter. edge of inferior articulating surface,	0·67	0·70	..	..
Greatest transverse diam. at top,	0·25	0·25	..	..
Antero. post. diam. from antero. post. tubero. to post. ext. of internal condyle,	0·29	0·31	..	..
Transverse diam. at bottom,	0·21	0 20	..	..
Diam. antero. post. of internal side,	0·14	0·13	..	..
Length of fibula,	0·62	0·65	..	..
Breadth at bottom,	0·10	0·10	..	.

except at the lower part of the great trochanter, the specimen affords ample means of comparison with the femur of the existing species.

On reverting to the table of dimensions it will be observed, that this fossil exceeds, as did also the humerus, any of those in Cuvier's table of existing species. The preceding columns show in what respects the proportions of the bone vary from those deduced from Cuvier's Indian rhinoceros. The length of the femur is here the modulus.

From a comparison of the two first columns in the above table there results, that the fossil has a greater development at its upper and a somewhat less development at its lower extremity than is the case in the Indian rhinoceros. The third trochanter is set lower down, and the inferior extremity of the small trochanter higher up than in the existing species; the articulating head is larger in proportion in the fossil than in the Indian rhinoceros. None of these modifications however are excessive; on the contrary, they are less than those which exist amongst the fossils themselves, which are all three undoubtedly of the same species. From the manner in which the lower and exterior part of the great trochanter is broken, there is every probability that a descending point protruded from the fractured surface towards the third trochanter, the ascending point of which is very perfect.

The third trochanter, however, differs from that of the existing species as figured in Cuvier's *Oss. Foss.* in not possessing the double point; for it has a single well defined ascending process, without any sign of the bicuspid termination. The lower edge of this trochanter, instead of ascending with a gradual swell towards the point, as in the existing species, has a counter curvature to that of the upper edge. The chief dissimilarity between Cuvier's plate and the fossil occurs in this part of the bone, the third trochanter assuming a different shape, and offering a variation more distinctive than any other presented in either extremity. This circumstance, together with some of the proportions of the cranium, has led us for the present to distinguish these remains by appending the word fossil to the name of that species of which they are the prototype: but we dwell on the necessity of more extended research, and the collection of a greater series of tables of dimensions of the Indian rhinoceros, before any thing absolutely conclusive can be pronounced with regard to the fossil and existing species.

We have had no hesitation in ascribing the two limbs dug up in such close neighbourhood to the same animal; an additional confirmation of the correctness of the assumption may be derived from the proportion which exists between these two extremities, when compared with that which occurs in the Indian rhinoceros.

Ind. Rhin. femur and tibia,	met.	0.960	humerus and radius,	met.	0.868
Fossil Ind. Rhin. do. do.	,,	1.056	ditto do.	,,	0.947

In the first, the humerus and radius are to the femur and tibia in the ratio of 1 : 1·10; in the fossil the ratio is 1 : 1·11.

The analogy which exists between these fossil extremities and those of the Indian rhinoceros being no less striking than that which was observed between the cranium Pl. XV. and the skull of the existing species, we have considered such correspondence sufficient to prove, that the fossil anterior and posterior limbs appertained to an animal of the same species, and of about similar size to the one of which the cranium in question is a relic.

Even in the event of a much closer approximation of symmetrical proportions than that given in this paper being obtained, we are aware that identity of species could not be presumed. It could not be assumed that the skin, the external appearance of the animal, was precisely similar to that of the existing species. The fossil Indian rhinoceros must, however, have presented a figure bearing a strong general resemblance to the uncouth symmetry of its present representative.

Remarks on part of the specimens delineated in Plate XVII.

When describing the specimens of upper and lower jaws, the possibility of the existence of another species was noted. The fossil femur, of which figs. 3, 4 are representations, would be corroborative of the fact, were it not for a peculiarity which renders it somewhat doubtful whether or not it may be attributed to a species of rhinoceros. On comparing it with Pl. XVIII, the dissimilarity of the two bones will be at once apparent. The third trochanter is in fig. 3, placed about the centre of the femur, in which respect it resembles the unicorn of Java, thus described by CUVIER: " Le femur à son troisieme trochanter placé au milieu de son côte externe, large, recourbé en avant, ne remontant pas de sa pointe vers le grand trochanter lequel ne donne non plus aucune pointe pour venir à sa rencontre. L'echancrure entre eux n'est donc pas close en dehors; mais du reste elle est aussi grande que dans l'unicorne. La tête inferieure est plus enlargée en arriere." The latter remark, however, does not at all apply to the fossil, which has its inferior extremity much compressed instead of developed; so much so, indeed, that but for the other parts of the bone it could not for a moment be a matter of doubt whether or not it came from a rhinoceros.

Figs. 10, 11. Axis of a rhinoceros: the spinous process appears shorter and deeper than the one figured by Cuvier, and the main foramen more regularly circular.

Figs. 12, 13. A calcaneum which appears not to differ from that of the existing species.

Fig. 14. Tarsus and metatarsus. In this specimen the medial metatarsal bone is not so long as that of the Indian rhinoceros, but longer than that of any other species given by Cuvier. The general form corresponds with that in Cuvier's plate.

Fig. 15. Metacarpal bones: the medial one is rather longer than the same bone in the Cape rhinoceros, and considerably longer than in any other species.

Figs. 16, 17, are the external metacarpal of the left side.

Fig. 18. An astragal, which differs much from those figured by Cuvier, being higher, narrower, and more compressed.

Fig. 19. Tarsal and metatarsal bones of a rhinoceros, with the lower portion of tibia attached.

Table of Dimensions.

Measurements of the head.	Cranium. Pl. XV.		Occiput. Pl. XVII.	
	Met.	In.	Met.	In.
Height of occiput from lowest edge of occipital foramen to top of crest,	0·259	10·20	0·223	8·78
Greatest breadth of occiput, behind auditory foramen,	0·341	13·44	0·266	10·50
Least thickness of cranium at temporal bones,	0·126	4·95	..	..
Breadth between post orbital apophysis of frontals,	0·254	10·00	..	..
Distance from anterior of orbit to auditory foramen,	0·325	12·80	..	..
Space occupied by the seven molares,	0·324	12·75	..	..
Breadth across occipital condyles,	0·195	7·70	0·140	5·51
Ditto of occipital foramen,			0·0575	2·25
Height of ditto ditto,			0·049	1·90
Distance between internal extremities of glenoid facets of temporal,			0·0735	2·88
Ditto from lower edge of occipital foramen to medial post. extremity of palate,	0·368	14·50		
Ditto from post. of right occipital condyle to spring of nasal arch,	0·539			
Ditto ditto ditto to anterior of orbit,	0·449	17·71		
Depth from edge of maxillary at 5th molar to upper surface of frontals,	0·239	9·42		
Greatest transverse width of nasals at horn site,	0·174	6·86		
Ditto external breadth at 6th molar,	0·246	9·72		
Thickness of cranium over the medial post. extremity of palate,	0·204	8·06		
Height of highest point of nasal arch above anterior of palate,	0·238	9·38		
Perpendicular from a line tangential to the summit of crest and vertex of nasal arch to the depression of frontals,	0·099	3·91		

Measurements of Upper Molars.		Cranium. Pl. XV.		Cranium. Fig.3 Pl. XIX.		Fig. 1. Pl. XIX.		Fig. 2. Pl. XIX.		Fig. 4. Pl. XIX.	
		Met.	In.	Met.	In.	Met.	In.	Met.	In.	Met.	In.
Greatest length Molar,	1	..	..	.030	1.19	.0295	1.14	.030	1.20	..	..
	2	.035	1.36	.034	1.335	.038	1.49	.0395	1.53	.039	1.49
	3	.045	1.75	.0475	1.86	.053	2.07	.056	2.17	.045	1.74
	4	.049	1.92	.058	2.26	.061	2.39	..	..	.056	2.20
	5	.044	1.69	.061	2.37	..	..	..	..	..	..
	6	.0495	1.96	..	..	..	..	..	..	..	..
	7	.0755	2.96	..	..	..	..	..	..	..	..
Greatest breadth Molar,	1	..	..	.024	0.95	.024	0.95	.0285	1.09	..	..
	2	.059	2.31	.0385	1.5	.036	1.40	.041	1.58	.037	1.45
	3	.080	3.15	.049	1.9	.045	1.88	.053	2.05	.051	2.007
	4	.083	3.36	.0575	2.25	..	..	..	..	.059	2.30
	5	.081	3.19	..	..	..	..	..	..	..	..
	6	.089	3.48	..	..	..	..	..	..	..	..
	7	.083	3.25	..	..	..	..	..	..	..	..

Measurements of Lower Molars.		Fig. 1. Pl. XVI.		Fig. 2. Pl. XVI.		Fig. 3. Pl. XVI.	
		Met.	In.	Met.	In.	Met.	In.
Greatest length of Molar, ...	1	.016	0.61	..	..	.017	0 67
	2	.037	1.44	.0335	1.30	.033	1.29
	3	.053	2.09	.050	1.98	.0425	1.67
	4	.047	1.82	.056	2.18	.046	1.79
	5	..	..	..	..	..	..
	6	..	..	..	..	..	..
	7	..	..	..	..	..	..
Greatest breadth of Molar, ...	1	..	..	..	..	.0115	0.46
	2	.020	0.77	.021	0.81	.018	0.70
	3	.026	1.01	.027	1.05	.025	0.98
	4	.029	1.12	.029	1.10	.030	1.19
	5	..	..	.	..	..	..
	6	..	..	..	..	..	..
	7	..	..	..	..	..	..

Measurements of Anterior Extremity.	Fig. 1. Pl. XVII.		Fig. 5. Pl. XVII.		Fig. 6. Pl. XVII.		Fossil humerus not drawn.		Fossil humerus not dwn.	
	Mt.	In.	Mt.	In.	Mt.	In.	Mt.	In.	Mt.	In.
Length of humerus from tub. to external condyle,...........	.538	21.20	.488	19.22	.482	19.0	.4	..	..	..
Do. do. do. internal do........	.492	19.38	.461	18.15	..	..	..	..	..	..
Greatest anter. post. diam. at top,..................... .	..	..	.218	8.60	.208	8.20	.200	7.90	..	..
Breadth across condyles, ...	.193	7.60	.183	7.22	..	..	..	..	.176	6.94
Breadth of the articulating pully,...	.119	4.70	.111	4.40	.121	4.80	.104	4.10	.109	4.30
Least diam. of the body of the humerus, ...	.078	3.07	..	..	.073	2.90	.071	2.82	.069	2.75
Length of the radius,.........	.409	16.10	..	..	..	..	..	..	..	..
Breadth at top,...............	.124	4.90	..	..	..	..	..	..	..	..
Ditto at bottom,.............	.124	4.90	..	..	..	..	..	..	..	..
Length of humerus from art. head to internal condyle, ..	.441	17.40	.393	15.51	.420	16.55	.389	15.35	.398	1570

Measurements of Posterior Extremity.	Femur&c. Pl.XVIII		Fossil femur not drawn.		Fossil femur not drawn.		Figs. 3 and 4 Pl.XVII.		Fossil femur not drawn.		Fossil femur not drawn.	
	Mt.	In.	Mt.	In.	Mt.	In.	Mt.	In.	Mt.	In.	Mt.	In.
Length of femur from ant. head to bottom of 3rd trochanter,	.449	17.70	..	..	.383	15.10	..	..	.328	12.94	.369	14.56
Length of femur from ant. head to bottom of internal condyle,	.621	24.45	..	..	.539	21.25	..	..	.510	20.10	..	..
Breadth from head to most salient part of great trochanter,	.269	10.60	..	..	..	..	..	..	..	..	..	..
Breadth across condyles, ...	.173	6.82	..	..	.143	5.63	.146	5.75	..	..	..	..
Antero. post. diam. of internal condyle, ..	.214	8.45	.221	8.70	..	..	.166	6.55	..	..	..	..
Ditto do. do. external condyle, ...	.161	6.35	.162	6.40	..	..	.139	5.48	..	..	..	..
Distance between bottom of 3rd trochanter and top of first, ...	.383	15.10	..	..	..	..	..	..	..	..	..	..
Distance between bottom of small trochanter and top of head of femur, ...	.259	10.20	..	..	.249	9.80	..	..	.215	8.50	.231	9.10
Diam. of articul. head of femur, ...	.118	4.65	..	..	.086	3.40	..	..	.089	3.50	.083	3.30
From lower side 3rd trochanter to bottom of external condyle, ...	.242	9.53	.177	7.00	.208	8.20	.266	10.50	..	..	..	..
Length of tibia from anter. tubero. to anter. edge of infer. articu. surface, ..	.435	17.15	..	..	..	..	..	..	..	..	..	..
Greatest transverse diam. at top, ...	.156	6.15	..	..	..	..	..	..	..	..	..	..
Antero. post. diam. from anter. tub. to post. ext. of internal condyle, ...	.195	7.70	..	..	..	..	..	..	..	..	..	..
Transverse diam. at bottom, ...	.128	5.05	..	..	..	..	..	..	..	..	..	..
Diam. of antero. post. internal side,......	.086	3.40	..	..	..	..	..	..	..	..	..	..
Length of fibula, ...	.405	15.95	..	..	..	..	..	..	..	..	..	..
Breadth at bottom, ..	.064	2.54	..	..	..	..	..	..	..	..	..	..

Index to the Plates referred to in this paper : shewing also their orders of succession.

Pl. XV. Three views of fossil cranium, (on lithographed paper.)

Pl. XIX. Views of connected and detached molars upper jaw, (copper plate.)

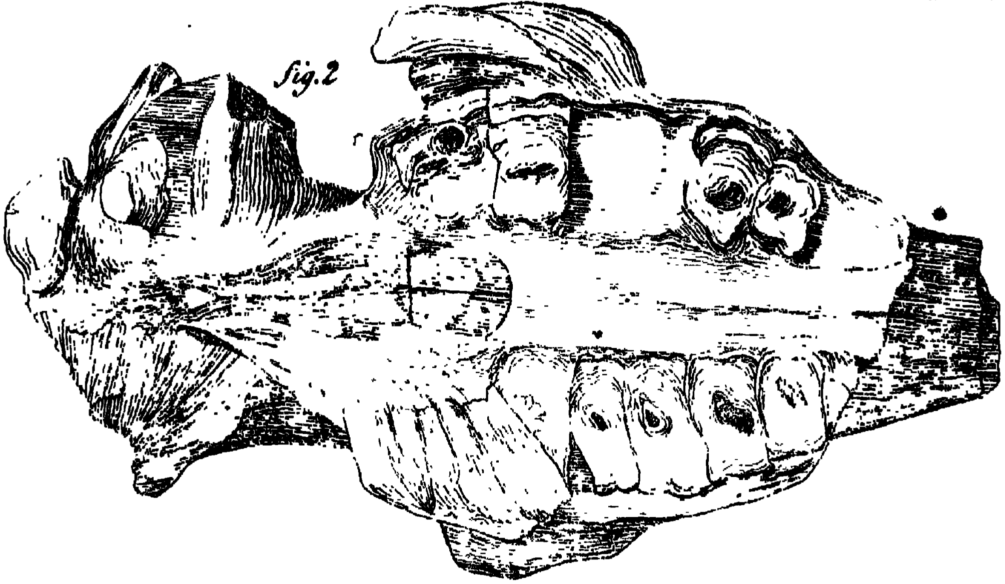
Pl. XVI. Ditto fragments from lower jaws, (lithographed paper.)

Pl. XVIII. Three views of femur and tibia.

Pl. XVII. A folding plate on lithographed paper, sundry bones of the extremities.

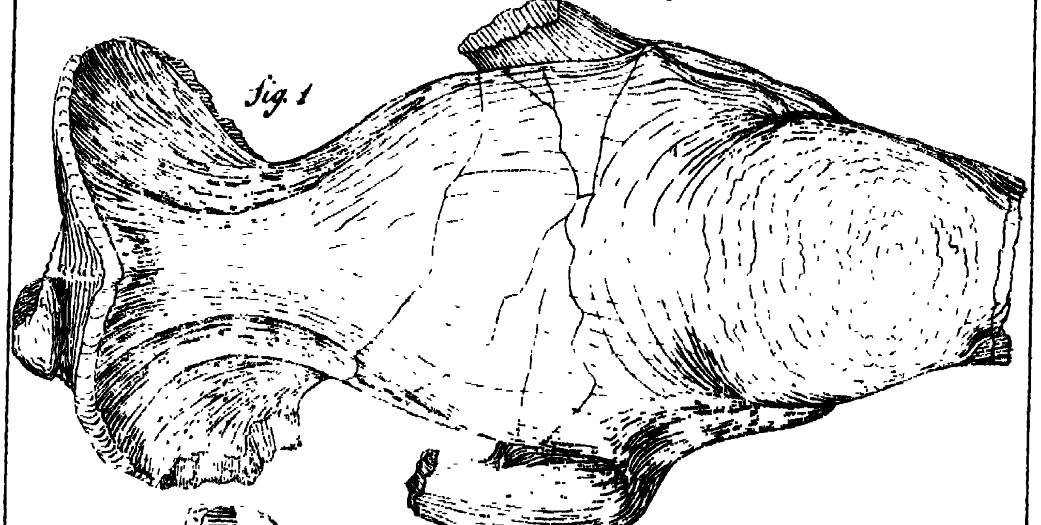
[The letters appended to the plates for convenience of reference in the MS. ; namely, A, B, C, D, E, F, have been changed in printing into Nos. XVIII, XVII, XV, XIX, and XVI. Plate F was, as before stated, spoiled in transferring it to the stone. By mistake the dimensions in Pl. XV, have been marked *one-fourth* in lieu of *one-sixth ;* a material error, which it is as well to notice thus prominently.—Ed.]

fig. 2



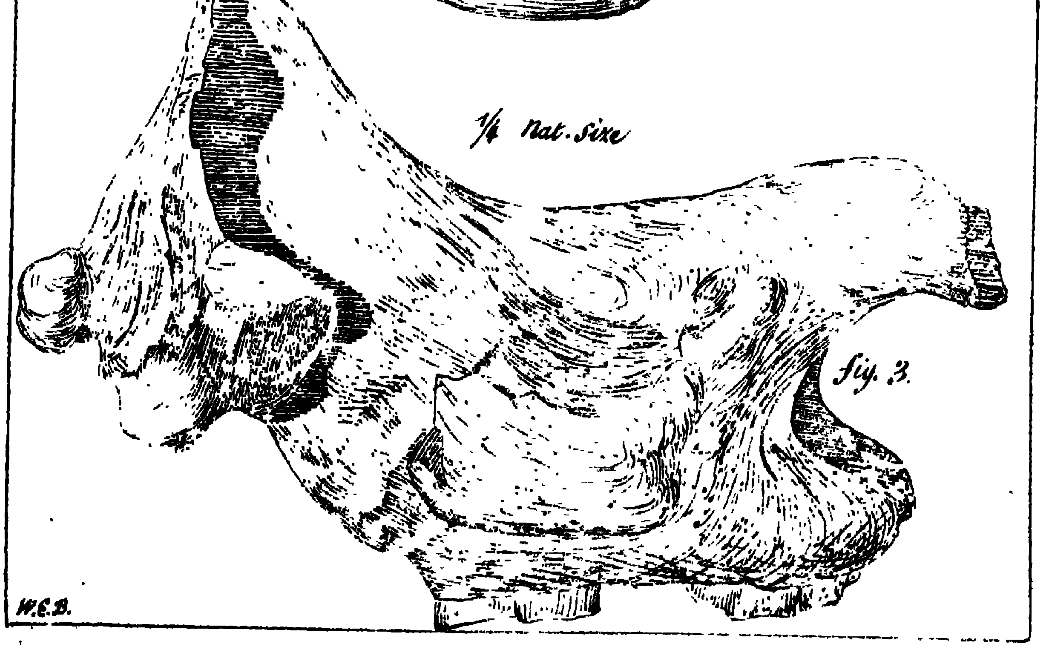
Fossil remains from the Sub Himalayas Rhinoceros

fig. 1



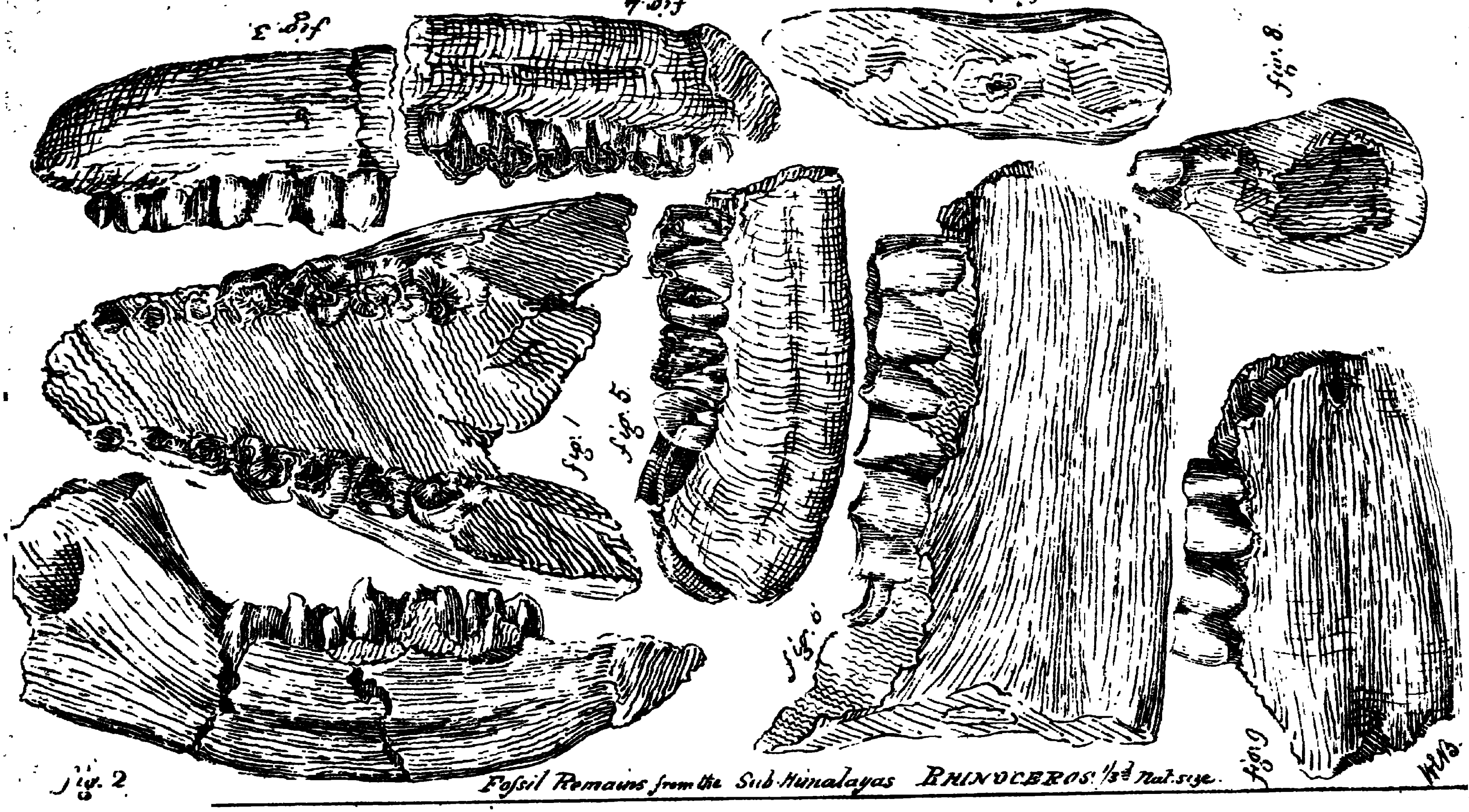
1/4 Nat. Size

fig. 3



W.E.B.

J. B. Tassin's Lithʸ. Press _ Calcutta.



Foſsil Remains from the Sub-Himalayas RHINOCEROS 1/3d Nat. size.

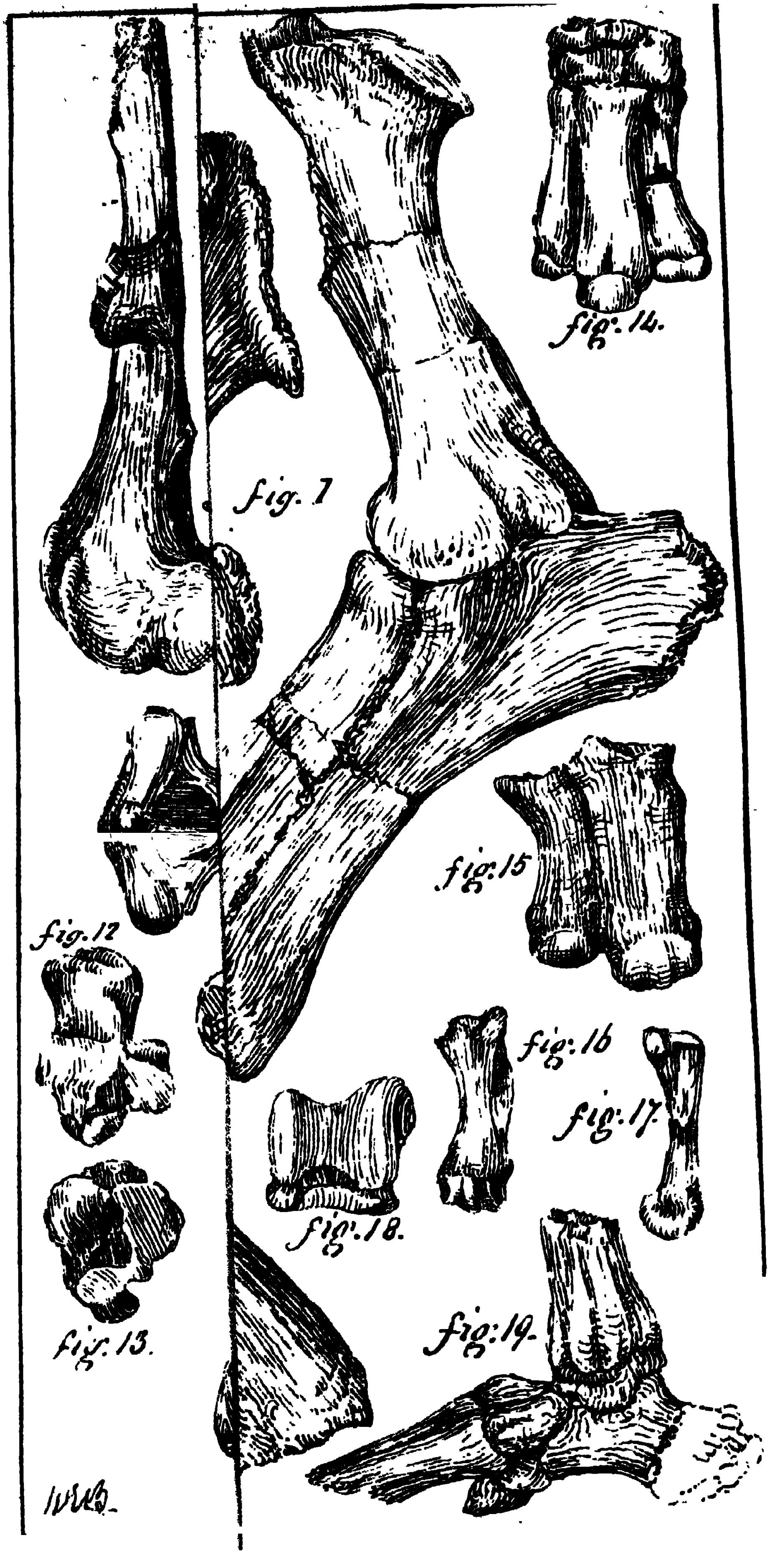

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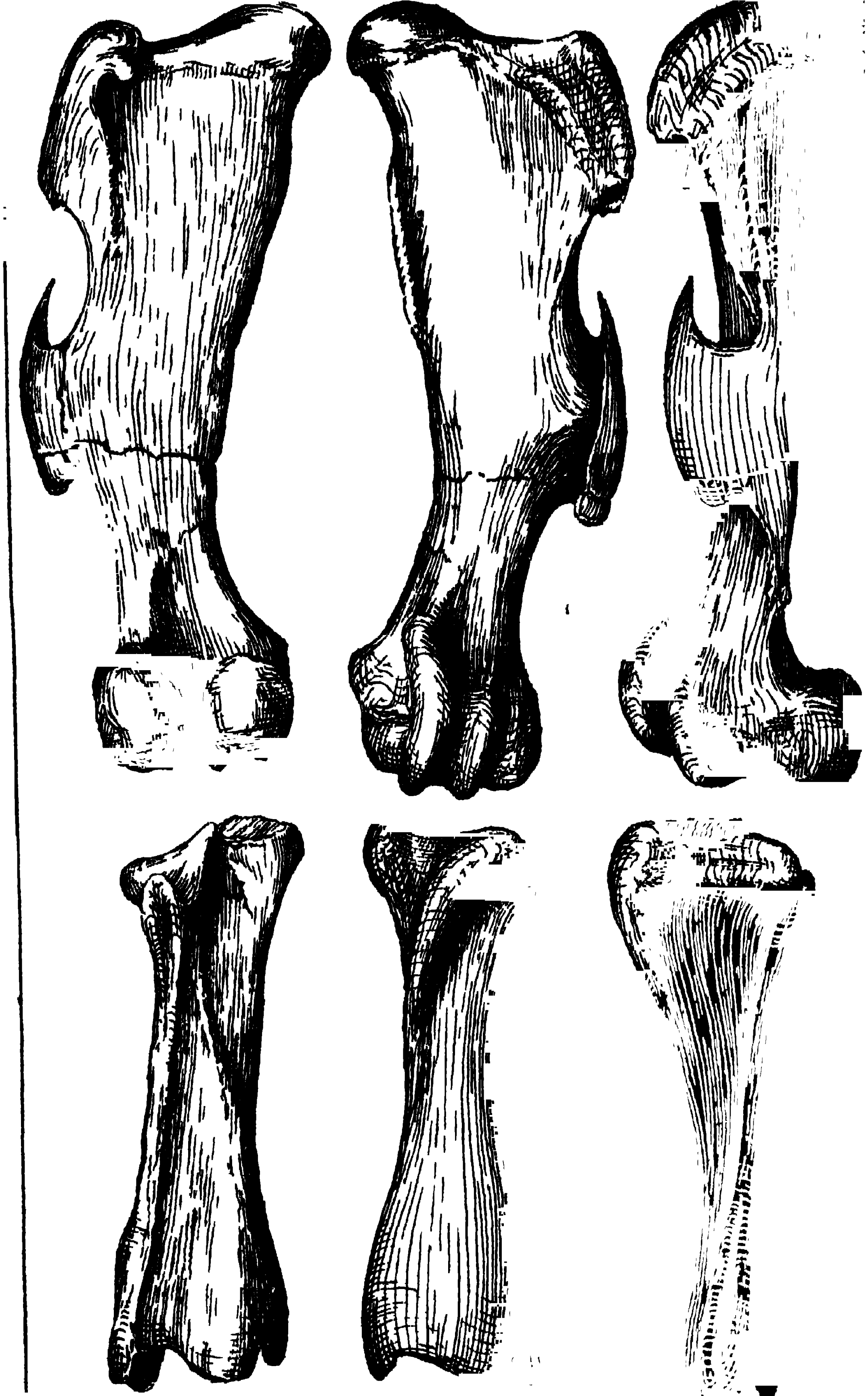
fig. 7
fig: 15
fig. 12
fig: 16
fig: 17.
fig: 18.
fig: 13.
fig: 19.
WWB.

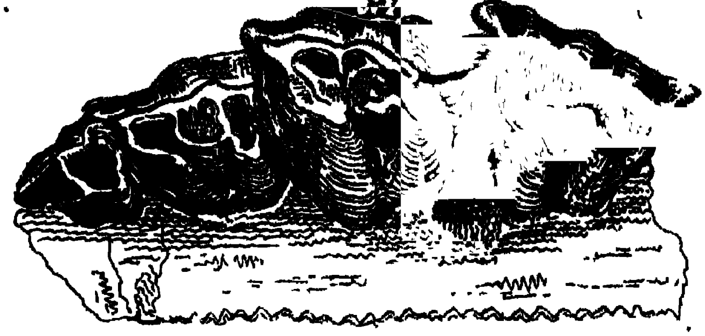
1/8 Natural Size



Foſsil Remains from the Sub-Himalayas_ RHINOCEROS

Fossil Rhinoceros of the Sub-Himalayas.

1



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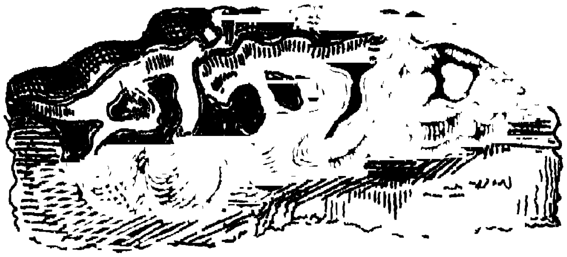

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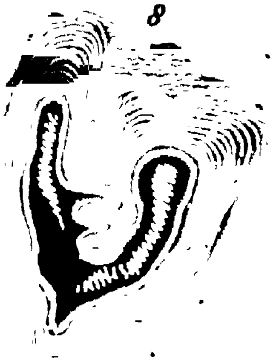

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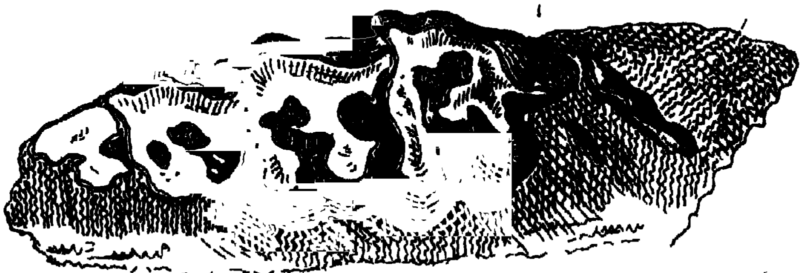

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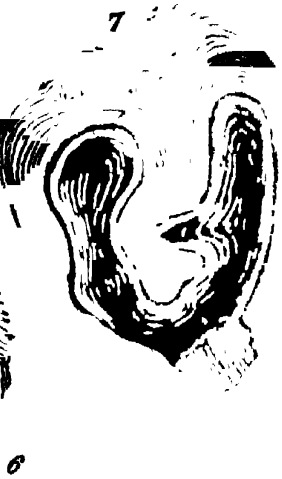

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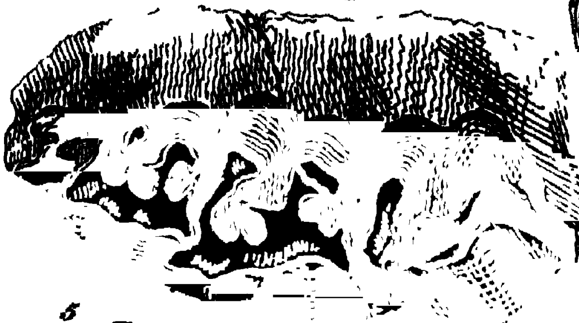

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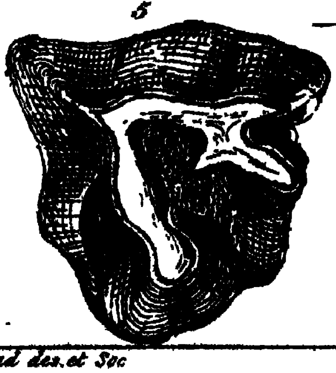

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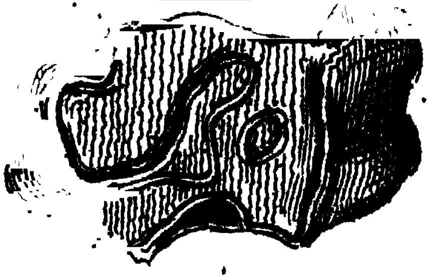

Durand des. et Sc.

V.—*Note on the States of Pérak, Srímenánti, and other States in the Malay Peninsula.* *By* T. J. Newbold, *Lieut., A. D. C. to Brigadier General* Wilson, *C. B.*

Pe'rak.

Pérak is separated on its northern frontier, from *Quédah* by the *Krian* river, which debouches into the Straits of Malacca, in about 5° 10′ North. On the south it is divided from the piratical state of *Salangore*, by a river of inconsiderable magnitude called the *Runkúp*, which lies a little to the north of the *Bernam* river, in about 3° 59′ north; interiorly, by the chain of primitive mountains, that run down the centre of the Malay peninsula to *Point Romania* near *Singapore*, from the states of *Tringánu* and *Paháng* on the opposite coast. According to Captain Glass, the territory under the sway of the *Pérak* chief extended about 50 leagues inland: its length along the coast is upwards of 120 miles.

The principal town is situated a considerable distance up the *Pérak* river, which is one of the largest and most rapid of the streams of the peninsula that flow into the Straits of Malacca: according to Anderson, it will admit vessels drawing 12 feet. The channel, however, is tortuous and intricate. The banks are generally covered with jungle, having but a few villages at considerable distances. The places of most note are *Kota Lámut*, *Bander*, *Pantong Panjang*, and *Pássir Gáram*, about 30 miles up the river. The chief generally resides at *Pássir Suyóng* or *Pássir Pulye;* places about three or four days' pull from the mouth. It has been stated to me by natives, that there are several stockades commanding the approach by water to these places.

Produce.—The principal products of this state are tin, rice, and ratans. The present produce of tin is about 8,500 *picals* annually: this goes for the most part to the *Pinang* market: latterly some of it has found its way to *Singapore*. Mr. Anderson states, that the Rája Mu'da and Tuanku Hassin, sons of the late chief, Taj-uddin, established posts a few years ago, about 30 miles from the river's mouth, where they levied a duty on all tin exported. These posts have since been abandoned. The chief himself derives most of his revenue from a toll on the tin produced: so much, it is said, as from four to six dollars per *bhar* of 3 *piculs*. The Dutch enjoyed, for upwards of a century and a half, during their sway at Malacca, the monopoly of the tin. They had a factory at *Tanjong Puttús* on the river, and a small fort on the harbour between the Dinding Islands and the main. The cultivation of rice has, of late years, been on the increase. I was assured, by some respectable *Pérak* traders, that more than sufficient for home consumption was now grown.

Population.—The population of *Pérak* is roughly calculated at 35,000 Malays, professing the Mahomedan religion, not including the aboriginal tribes; a few Chinese, Arab and *Chuliah* (Malabar ?) settlers.

History and Government.—*Pérak* was formerly tributary to the Malayan sovereigns of Malacca, and afterwards to those of the kingdom of Achin. Since the decline of the latter, however, it has become in some measure independent; although Siam has, at various periods, asserted her claims to sovereignty, and demanded tribute. In consequence of the spirited resistance of the late chief, TAJ-UDDIN, to these arrogant and groundless assumptions, *Pérak* was overrun in 1818 by the troops of the Rája of *Qúedah*, who had invaded it by order of the king of Siam. In 1822 the Siamese were expelled, and the rightful chief restored, by the powerful assistance of the late warlike chief of *Salangore*, Rája IBRAHIM.

The government is despotic. *Pérak* has been ruled during the last three centuries by a race of chiefs, under the title of *Sultan*, who were connected with the ruling dynasties in *Johóre* and *Achin*. Under the *Sultan* are five officers of state, forming a deliberative council, viz:—the *Bandahára, Tumungong,* Rája *Múda, Mantri*, and *O'rang Káya Besár*. Besides these there are six *Panghúlús* over the six *Bongsas (Vansas)* or classes, into which the people are divided.

The succession to the throne is generally hereditary. *Sultan* MANSU'R SHA'H II, who died in 1818, was succeeded by his son TAJ-UDDIN, who died about four years ago. His nephew, the present chief, Rája CHO'LÁN, succeeded.

Political and Commercial relations with the British Government.—In 1818 a treaty of commercial alliance was concluded by the British Commissioner, Mr. CRACROFT, on the part of the Company, with the then Rája of *Pérak, Sultan* MANSU'R SHÁH, chiefly with the view of preventing the monopoly of the tin trade by the Dutch, who were, at that time, about to resume possession of Malacca. This treaty provided against the monopoly, and secured to British merchants the privilege of being allowed to trade on equally favorable terms with *Pérak* as any other nation.

By Major BURNEY's treaty with *Siam* in 1826, it was agreed that the Rája of *Pérak* should govern his country according to his own will; should he desire to send the gold and silver flowers to *Siam*, as heretofore, the English would not prevent him. That if *Chow Phyá*, of *Ligore*, desire to send down to *Pérak*, with friendly intentions, forty or fifty men, whether Siamese, Chinese or other Asiatic subjects of Siam, or if the Rája of *Pérak* desire to send any of his ministers or officers to seek *Chow Phyá* of *Ligore*, the English should not forbid them. That no force should be sent by either nation to go and molest, attack or disturb *Pérak.* The English engaged not to allow the state of *Salangore* to attack or disturb *Pérak;* and the Siamese, in turn, engaged not to go and attack or disturb *Salangore.*

The Siamese also stipulated in this treaty, that the present ex-king of *Québedah* should not be permitted to live at Prince of Wales' Island or *Prye,* or in *Pérak, Salangore,* or any Burmese country.

SRI'MENÁNTI.

Srímenánti, though formerly considered as subordinate to *Johóle,* asserts her independence, and has tacitly assumed a place among the four elective states, though her claims are not distinctly recognized. The *Panghúlús* of *Srímenánti,* not being descended from the nine to whom titles were given by the Sultan of *Johóre,* assumed by the sanction of the *Panghúlú* of *Johóle,* that of *Sétia Mahárája.* Since this, seven *Panghúlús* have ruled in *Srímenánti,* the six last of whom were *Naham, Jallam, Allam, Pompom, Tallún,* and *Tálib.*

Rája RADIN, one of the sons of the fourth *Menangkábówe* prince, SINGANG LAUT, assumed similar powers to those exercised by the *Eang depertúan múda* of *Rumbówe* in this state, which he still retains, though now opposed by another candidate from *Menangkábówe.*

There are twelve *Súkús* over the twelve tribes in *Srímenánti;* their names with their titles are as follows:

Amin, Baginda Mahárája, Olay, Senára Múda, Molay, Mahárája; Manti, Padúka besár; Lattih, Orang kaia bongsu; Arrih, Sempúrna Mahárája; Lésáh Senára kaia; Aggah, Sri Mahárája; Eytút, Orang kaia kechil; Bandin, Senára Angksa; Si Main, Mahárája Lélah; and *Rejab, Perdana.*

The names of the twelve tribes are, *Sri Lummah Pahang, Sri Lummah Menangkábówe, Battu Ampar, Tannah Dattar, Sa Melóngan, Tiga battu, Payakumba, Muncal, Anak Achi, Battu Balang, Tiga Nenik,* and *Bódoanda Jacoon.*

Srímenánti is the place of residence, burial, and contains the *Astána* of the princes deputed from *Menangkábówe.*

It is bounded on the north by *Jhompóle;* towards the south by *Ulú Múar* and *Rumbówe,* (from which it is separated by the mountains of *Lepat Cajang* and *Gúnong tújoh;)* to the east its boundary with *Johóle* is the hill of *Búkit Pecla;* and to the west the *Paro* stream and *Teráclu* divide it from *Súngie-ujong.* The extent of *Srímenánti* is supposed to be about equal to that of *Rumbówe:* its population is estimated at 8,000. The principal villages are those of *Srímenánti Pinang, Saribú Peela, Póndok Passer,* and *Teráchi;* the two latter places now claim their independence. Like *Srímenánti* itself, they were formerly subordinate to *Johóle*, and have been governed for seven generations past by their own *Panghúlús*. The name of the present chief of *Teráchi* is *Súlong*, and under him are six tribes. The *Panghúlú* of *Póndok passér* is named Ambong: it was with this chief the ex-*Panghúlú* of *Naning* sought and found a shelter after his defeat and expulsion in 1832. Part of *Teráchi* was formerly subject to *Súngie-ujong;* but during the late internal commotions and struggles for power, by which the *Menangkábówe* dynasty has been rooted out, leaving the interior in a state of anarchy and confusion, the minor chiefs seized on the opportunity to assert their independence, and in this unsettled condition they remain up to the present time.

The manners and customs of the inhabitants of *Srímenántí*, its revenue, internal administration, and law of inheritance, are much the same as those of the natives of the three states already described.

Its produce is tin, sapan wood, wax,* ratans, and rice, most of which find their way down to Malacca.

A fresh tin-mine has been lately opened at a place called *Plangaye*, the produce of which during the last three months has been 30 *bhars* of metal.

States of Calang Jellabú, Ulu Pahang, Jellye, and Segámet.

Of the nine interior states, or *Negri sambílan*, formerly tributary to the Malayan dynasties of *Malacca* and *Johóre*, four already noticed, with their dependencies, acknowledged the sway of *Menangkábówe*, or rather of its deputed prince. The remaining five, viz., *Ulu Pahang*, *Calang*, *Jellye*, *Jellabú*, and *Segámet*, with their dependencies, adhered to *Johóre:* this kingdom, however, was too weak to retain them all. *Calang* was wrested from her by a colony of *Búgís*, who established an independent government at *Salangore* towards the beginning of last century, which has rendered itself formidable to its neighbours by the hardy, warlike, and piratical habits of its chiefs, but is now fast declining.

Jellabú has been taken possession of by the descendants of the *Menangkábówe* princes, and is now ruled by an *Eang Depertúan*, named *Rája* SABU'N, son of *Rája* ADIL, the second chief from *Menangkábówe*. This chief is looked upon by the superstitious Malays as a living *Krámet*, from the circumstance of his having "white" or very light blue eyes, with jet black hair.

Jellabú was governed formerly by its *Panghúlú* and *Ampat Súkú*. These still retain considerable authority; the name of the present *Panghúlú* is ABDUR RAHMAN; his title *Akhir Zumán;* the titles of the *Ampat Súkú* are *Dattu Menniang*, *Dattu Mantri*, and *Mahárája Senára*.

The tribes under them are those of *Bodoanda, Tannah Dattar, Muncal,* and *Battu Ballang.*

The forms of government, laws, &c. obtaining in *Jellabú* are much the same as those of the states already described. Its population, which is divided into seven múkims, is estimated at 3750, not including the aborigines.

The produce is gold, ivory, tin, (about 200 picals annually), aloe-wood, jaggery, ratans, &c.; these generally find their way to the *Pahang* market.

The boundary marks of *Jellabú* with *Pahang* are nine Meranti trees, *(Meranti Sambilán,)* growing on the right bank of the *Jellabú* river; with *Sungie Ujong,* a hill called *Bukit Tangoh* and *Dhalu Karu Bandar Barangan;* with *Jompóle,* the hill of *Bukit Dejála;* and with *Calang,* the hill of *Guinting Perhi.*

Ulu Pahang and *Jellye* are now tributary to the *Bandahára* of *Pahang,* a chief nominally feudal to the kings of *Johóre. Jellye* is immediately governed by a *Panghúlú* styled *Mahárája Purba.* It produces a considerable quantity of gold and tin, which go to *Pahang.* Both this state and *Jellabú,* on account of their remoteness from the British frontier, have had little political connexion with the several governments at Malacca.

VI.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 7th September, 1836.

The Honorable Sir Edward Ryan, President, in the chair.

The Proceedings of last meeting were read.

Lieutenant Newbold was proposed as a member by the Secretary, seconded by Dr. Mill.

Lieutenant S. Tickell, proposed by Dr. Pearson, seconded by Mr. Prinsep.

Mr. Vincent Tregear was proposed as an honorary member by Capt. A. Cunningham, seconded by the Secretary:—referred to the Committee of Papers.

Read, letters from Dr. R. Harlan and Professor Lea of Philadelphia, acknowledging their election as honorary members, and presenting various works which will be found under the head of "Library,"

Read, a letter from Mr. J. K. Kane, Secretary American Philosophical Society, Philadelphia, acknowledging receipt of Researches, Vol. XVIII. and Index, and Journal, Vol. III.; and presenting publications in return.

Also, letters from M. P. H. Fuss, Secretary of the Imperial Academy of St. Petersburgh; and from Mr. Gabriel Döbrentei, Secretary of the

Hungarian Society at Pest, (in the Hungarian, Latin, and English languages,) noticing the receipt of M. Csöma's Tibetan Dictionary and Grammar.

The following letter from the Honorable G. Turnour was read.

Kandy, July 8, 1836.

Sir,

Various circumstances have concurred to prevent my presenting the Asiatic Society with the accompanying pamphlet sooner. Its completion has been delayed, partly from want of leisure, and also in some degree from my having entered more fully into an account of Páli Buddhistical literature, and published more of the *Maháwanso* in this volume, than I had designed when I addressed you on the 10th July, last year.

In presenting a copy of this publication to the Governor General and the Governors of the several Presidencies, I have mentioned that I had adopted this preparatory course, with the view of eliciting the criticism of oriental Societies and scholars on this portion of the *Maháwanso*, before the principal work issued from the press; and of thereby, at once, obtaining either a confirmation or refutation of the expectations I entertain as to its pointing out the road to a new and interesting field of research in Asia. It would be satisfactory, therefore, to me, if this pamphlet were referred to the Committee of Papers, for its judgment on it. At the risk of being considered affected, I repeat, that it is on the original work and on the general references thence deduced by me, that I court criticism. I cannot attach much importance to a translation, hastily made, of a work composed in a language which I have hitherto studied rather with the view of gathering information regarding the native institutions, than of familiarizing myself with its philological niceties.

The first volume of the *Maháwanso* has been printed. I have only to recast the introduction, and prepare a glossary, to admit of its publication.

If the contributions to your Journal offered in the introduction (p. 110) would be acceptable; as a preliminary step, I would suggest your transferring to its pages, from those of the Ceylon Almanac of 1836, Mr. Armour's translation of Kitetigama's Essay on Buddhism, as well as his prefatory letter. The author of that Essay was a Buddhist priest, of distinguished reputation for learning; and Mr. Armour is unquestionably the best European Singhalese scholar in the Island. The comprehensive form in which the system of Buddhism as recognized in Ceylon is presented in that Essay, and the definitions there afforded of particular terms, will both save details of explanations in my analysis, and serve to render it more intelligible.

I have the honor to be, Sir, &c.

GEORGE TURNOUR.

To the Secretary Bengal Asiatic Society.

Mr. H. T. Prinsep in reference to the above stated, that the Governor General had empowered him also to solicit the opinion of the Society on the character of the Ceylonese Historical Annals, to guide his Lordship in Council as to the extent of patronage to be accorded to the work by the Government of India.

In compliance with the wishes of the Governor General and of the author himself, Mr. Turnour's Introductory Essay, Historical Epitome and translation, were referred to the Committee of Papers to examine and report their opinion of the authenticity and value of the *Páli* annals, which the author has undertaken to introduce to the knowledge of the learned world, as well as upon the fidelity of the translation, confronted, as it is, line by line with the Pali original in Roman character.

The Secretary read the following report from the Committee of Papers on the proposition of Cavelly Venkata Lachmi'a, referred by Government to the Society at the last meeting.

Proposition of CAVELLY VENKATA LACHMI'A, *Pandit, to the Madras Government.*

To His Excellency Lieutenant-General the Right Honorable Sir FREDERICK ADAM, K. C. B., Governor in Council, &c. &c. &c.

Fort St. George.

RIGHT HONORABLE SIR,

Par. 1.—I have the honor to submit respectfully, the accompanying copy of a letter addressed to your Excellency from the Royal Asiatic Society of Great Britain and Ireland, for the consideration of your Excellency in Council, of which Society I am a corresponding Member, whereby it appears that that Society is very desirous to receive every literary information in this part of the world, with a view to complete the late Colonel MACKENZIE's collection. I most submissively solicit, that your Excellency in Council will be pleased to sanction every support from the Government regarding those researches, particularly to authorize me to open a general correspondence with the gentlemen of literary endowments, under this Presidency, in the revenue, judicial and military branches of the service, to enable me to procure every information on the subject of the History, Antiquities, &c. of India.

2.—I beg leave to submit the enclosed copy of an abstract, comprising a brief idea of the nature of the work in which I am engaged. I leave it to your Excellency in Council to judge what may be estimated to be the expense and establishment required to bring it to a completion. It would, however, be presumptive in me, at the present stage of affairs, to suggest any specific amount. But the work consists of twenty-one different ancient alphabets and fourteen languages, ancient and modern, of various parts of the Peninsula; consequently, I would observe, that I will have occasion to employ in every zillah, on the smallest scale, two intelligent scholars, one versed in Sanscrit and the other must be proficient in oriental literature, whose office it will be to collect ancient inscriptions from religious structures and holy temples, which will prove the best guide to ascertain the accuracy of the chronology and history of the country. If the collectors undertake a part of this laborious task, I should imagine that it will prove less expensive: yet I am led to fear greatly, that they can hardly afford to give any attention to it, with the exception of some few of the most literary characters. For the materials thus collected, I would require an establishment of pandits, translators, &c. to arrange and bring down such information that may be collected and approved of.

3.—It never can be expected that the postage of the vast correspondence connected with this arduous task, which are necessarily required by the above Society, can be carried on at my own expense; I therefore most respectfully beg the favor of your Excellency in Council to pass all communications to and from me, as a corresponding member of the Royal Asiatic Society, free of postage, in the same manner as was passed in the late Colonel MACKENZIE's time, relative to which the enclosed is a copy of a letter from the Post Master General of this Presidency, dated 8th March, 1809, for the information of your Excellency in Council, and in the same manner as the Madras Literary Society is still enjoying this privilege without any interruption, as stated to the President of the Madras Hindu Literary Society, in your Chief Secretary's letter under date 22nd February, 1834, which is about *to be discontinued.* But I would faithfully promise that no abuse or advantage shall be taken of the confidence that may be reposed in me on the subject.

I have the honor to be, Right Honorable Sir,
Your Excellency's most obedient humble servant,
(Signed) CAVELLY VENKATA LACHMI'A,
Corresponding Member of the Royal Asiatic Society of Great Britain and Ireland.

(A true Copy),

Madras, 16th June, 1835. *Chief Secretary.*

Report of the Committee of Papers on Cavelly Venkata Lachmi'a's *proposed renewal of Col. Mackenzie's investigations.*

The reference from the Madras Government, for an opinion on the merits of Venkata Lachmi'a pandit's proposition, however complimentary to our Society, might perhaps have been addressed with better effect to the Madras Literary Society, which must be far better acquainted than we can pretend to be, both with the character and attainments of the individual, and with those desiderata in the History of the Peninsula, which he undertakes to elucidate.

We, however, enjoy one advantage in the possession of Mr. now Professor, Wilson's Descriptive Catalogue of Col. Mackenzie's Collection, which, aided by other published works on the history of the Southern Hindu States, may enable us to form a tolerable opinion on the question.

It might be supposed from the entire silence of Venkata on the subject of Mr. Wilson's labours in the statement he has handed up to the Madras Government of the "Progress of the Researches" *in which he is engaged*, that he was a total stranger to the descriptive catalogue; although the brief notice he gives of each state and dynasty, appears based upon the summary contained in the introduction to that work, both as to arrangement and detail; and certainly it adds not one iota to the information made public by Professor Wilson in 1828.

The object of Sir Alexander Johnston, in persuading the Pandit to found a native literary society at Madras was, doubtless, that through the gratuitous aid of those best acquainted with the languages and traditions of the country, and having connections or friends dispersed over the Peninsula, the learned world might be put in possession of translations and digests of the mass of MSS. collected by Col. Mackenzie; at the same time that other materials of a similar nature might be sought out and accumulated*. The Vice-President of the Royal Asiatic Society does not seem to have contemplated the organization of an extensive paid establishment of collectors, pandits and copyists; otherwise it is probable he would have addressed himself to the Government itself, either directly or through the natural channel of the Madras Auxiliary Society. For he would have anticipated that such an extensive scheme would need the control of a master head, accustomed to generalization, and capable of estimating the value and drift of inscription and legendary evidence. The qualifications of Cavelly Venkata for such an office, judging of them by his "abstract," or indeed of any native, could hardly be pronounced equal to such a task, however useful they may prove as auxiliaries in such a train of research. The pandit's *original* and *arithmetical* mode of weighing authorities, of which examples may be found in every item of his statement, is any thing but calculated to contradict this assumption. His remarks on the first, or ancient *Nandavarrum* dynasty of *Andhra*, may be cited as an instance:

"As this is a very obscure dynasty, confidence can only be placed in the inscriptions. From the materials already possessed in the collection of Col. Mackenzie, I suppose *one-eighth* of the history of this dynasty is complete, and *the remainder* should be completed by further research."

The Mackenzie Manuscripts (embracing, as Cavelly Venkata says in his letter to Government, using the words of the late Colonel himself†, no less than *twenty-one* different alphabets and *fourteen* different languages) have been for some time at Madras deposited in the College Library. We have no means of knowing whether during that period the pandit (himself a servant of the college) has published or undertaken the translation or analysis of any part of its contents. In the absence of any such testimony of his competence, contrasted with what will be presently urged, it seems impossible to recommend any large outlay of public money in the way he proposes.

Not that it is undesirable to complete the examination of the Mackenzie papers. On the contrary, all who have read Mr. Wilson's catalogue, will grant that to be an object of high, of national importance; especially when it is asserted that many of the volumes are going rapidly to decay‡, and may not be available a few years hence. The British Indian Government has spent a lakh of rupees in purchasing these ancient records: to refuse the requisite aid for their examination and conversion to public use when they are known to contain a vast store of curious and interesting matter, would be false economy, only equalled by the case of the BUCHANAN MSS. in Calcutta, which cost even a larger sum, and which the Government has recorded its unwillingness to print even free of expense, or to take a single copy of it printed by others*."

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* See Mad. Lit. Soc. Journal, No. 12, p. 173.

† See Preface to Wilson's Des. Cat.

‡ See Taylor's Hist. cr. Man.

But happily, in regard to the MACKENZIE collection, such neglect cannot now be feared. Independent of Mr. WILSON's able summary, we are aware† that Captain HARKNESS, Sec. of the Roy. As. Soc., has undertaken to translate and digest a portion of the manuscripts in London, and M. JACQUET of Paris has intimated that the mass of the Colonel's inscriptions, to which the Hon'ble Court of Directors have handsomely allowed him free access, are to be included in the "*Corpus Inscriptionum Indicarum*," upon which he is now busily engaged; while in Madras itself has lately appeared an able and zealous expositor in the Reverend Mr. W. TAYLOR, whose previous study of, and publication on, the history of the Peninsula, added to his acquaintance with the Tamul and Telinga languages, eminently fit him for the task, and point him out as the properest, if not the only, individual capable of fulfilling the grand object proposed by Sir A. JOHNSTON.

This gentleman has already gone deep into the subject. At a great expence and sacrifice of time, he has published a variety of "*Oriental Historical Manuscripts*" in the original character and in translation, with a connective commentary, shewing their bearing on the general history of the country.

The Editor of the Madras Journal, indeed, announces that Mr. TAYLOR has further undertaken a careful examination of the whole of the College MSS., and that he promises "a paper or series of papers on the subject‡." It would certainly be most desirable that such examination should not be cursory or incomplete, that it should not leave any thing to be done by others, who would have again to travel over the same ground of previous study to be capable of undertaking it. It would, in short, be most expedient to secure the services of Mr. WM. TAYLOR publicly, for the thorough examination of the MACKENZIE records; to allow him such assistance as he might require for the period, (with him necessarily so much shorter than could be allowed to any other,) which he might fix for the task; to unite CAVELLY VENKATA pandit with him, should he be desirous of assistance, (although from an expression at page 63 of his second volume, it may be imagined that he would not count much on the aid of the late Colonel's native establishment,) and to sanction the publication of those records, which he might select as the most valuable, either in elucidation of history or native science, philosophy, religion, customs, &c.

For the collection of new materials, the zeal of the numerous members of the English and native literary societies of Madras, (scattered through the various districts,) will need only the suggestions and direction of a leader so well qualified, to accumulate them, without any necessity for a paid establishment. The circulation of a scientific journal throughout the presidency will materially contribute and doubtless has contributed to excite curiosity to such objects among the "*gentlemen of literary endowments*," whose correspondence either with Mr. TAYLOR or with CAVELLY VENKATA, might advantageously be allowed the indulgence of exemption from postage.

Without first ascertaining Mr. TAYLOR's willingness to accept the office here chalked out, or consulting him on the extent of the aid he would require, it is impossible to estimate the probable outlay; but the Government records will furnish comparative data, in the sums paid for the "oriental translating establishment," entertained for a period under the late Secretary of the Asiatic Society.

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* See Mr. Secretary BUSHBY's Correspondence with the Editor of the Gleanings in Science and Journal Asiatic Society.

† See Sir ALEXANDER JOHNSTON's address to the Royal Asiatic Society.

‡ Madras Literary Journal, No. 12, p. 173.

The volumes of Mackenzie papers in our library might advantageously be added to the other documents for the proposed scrutiny*, so that the whole might be published continuously; but these details will naturally come under consideration hereafter, should the Government agree in the view taken by the Asiatic Society, and resolve to entrust the undertaking to the individual pointed out, either directly or through the medium of the Society, (here or at Madras,) which might exercise its judgment as to the final publication, should Mr. Taylor consent to labour under its auspices.

(Signed) J. Prinsep, *Sec.*
For the Committee of Papers.

20th August, 1836.

Resolved, That the Society concur in the view taken by the Committee of Papers, particularly as to the expediency of engaging the eminent services of Mr. W. Taylor, for the examination of the Mackenzie MSS., and that the Secretary be empowered respectfully to communicate this opinion, in reply, to the Government.

Mr. Charles Brownlow submitted to the Society the following proposition, relative to a complete copy of the *Alif Leila*, or Arabic original of the 1001 nights entertainments, lately purchased by him from the estate of Major Macan, well known as the Editor of the *Shah Nameh.*

To James Prinsep, *Esq., Secretary Asiatic Society, &c. &c.*

Sir,

Having become the possessor of the original of the complete Arabian Nights Entertainments, formerly the property of Major Macan, apparently the first that has ever reached India; I am desirous of adding to oriental literature a work which has long been a desideratum with Eastern scholars, by its immediate publication. I trust that my views regarding the importance of this work are not unreasonable; at least I am not alone in my opinion, for no book extant has ever enjoyed such universal popularity as this, even in its translated form. Much of its narrative depicts, with miraculous fidelity, that most difficult class of incidents to describe with interest—the incidents of common life; and, beneath even its most grotesque and impossible circumstances, there is a moral beauty—a knowledge of humanity discoverable, which comes home to all, and *throughout,* a vivid power of description, which is unequalled in any other production, and addresses itself to the mind with an effect almost pictorial. It is the remark of an orientalist of high repute, speaking of this unique and extraordinary work, that " we here behold a genuine portrait of the spirit and character, the common life and domestic manners, of a once powerful nation, which excelled in arts as well as in arms, in three quarters of the globe; in these tales we see the Arabs, depicted by themselves, in the tents of the desert, and in the courts of the Caliphs. We mingle among their merchants, join them in their travelling caravans, visit them in their social circles, and even penetrate into their harems."

If the book appeal thus powerfully to the European reader, whose sympathies are weakened by distance and difference of habit, how much more emphatically must it address itself to the inhabitants of the East, in the overflowing and beautiful language in which it was originally written!

My chief object in this paper is to draw public attention to the document, and to give such evidence regarding its authenticity as I have been able to collect, under the very difficult and embarrassing condition of having no other complete copy to refer to. My attention has been directed, in the first instance, to the MS. alone, which contains the unbroken series of one thousand and one nights; next, to its quality, which is reported on by competent persons to be clear, and remarkably free from literal errors.

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* See printed catalogue of the Library Asiatic Society.

My next step was to examine the MS. with the printed edition of the "Two Hundred Nights," published some years since in Calcutta, whence it appears that the latter is a set of excerpts merely, made, in many instances, without regard to the literary value of the selection, and in some, overlooking even the integrity of the tales. These fragments have been arbitrarily renumbered as the "*first* two hundred nights."

I have been fortunate enough to obtain a copy of that edition of the original now in the course of publication at Breslau, by Professor HABICHT, an orientalist of high attainments; he has devoted his life (and it had need be a long one to enable him to fulfil his task), to the publication of a complete edition of this work; he has procured copies of the MS., perfect and imperfect, from Tunis, from Cairo, and from the library of the Baron SILVESTRE DE SACY, and is proceeding with the publication, subject to the critical collation of these MSS. I find, on comparing the MS. in my hands, with the edition of HABICHT, as far as published, i. e. to upwards of three hundred and fifty nights, that no important discrepancies occur, though, in transcripts of this length, there will always be found considerable differences. This fact is curiously illustrated by the German Professor, who has carefully set forth the variations, omissions, redundancies, and inversions of order, found on comparison of his various MSS. It is likewise stated by M. TREBUTIEN, in his preface to a recent French translation of this work, (published in 1829,) that he collated twelve manuscripts, and among them those of the King's Library at Paris, and the Bodleian copy, which presented continual discrepancies, both as to style and the order of the tales, which every copyist had arranged according to his own taste. These differences, though they would be important in a historical paper, are of little consequence in a series of fictions. They have manifestly resulted from the carelessness or caprice of the transcriber, and do not affect the value of the work. All that can be done, under these circumstances, is to adopt the reading most consistent with the context.

Beyond the print to which HABICHT's edition extends, there exist *here* no means of continuous comparison. The evidence of genuineness is strengthened, however, by finding, that the portion of the original already known in the Calcutta edition, is found in the manuscript in my possession, except that the stories, in the latter, stand in their natural and proper connexion with the remainder of the text. The tales generally correspond in their order with those found in SCOTT's translation of 1801, taking into account those contained in the supplementary volume, (translated from WORTLEY MONTAGUE's MS.) and allowing for the omission of those which the translator has deemed it best, from motives which he assigns, to pass over.

A remark made by the Baron PURGSTALL (VON HAMMER) on the subject of GALLAND's translation, is another strong proof of the authenticity of the manuscript before me. He says, "the MS. used by GALLAND* was far from complete; and if he published no more stories, it was not because the remainder were less deserving of translation, but because he had no more in his possession. The imperfection of his manuscript compelled him also to invent, as he has done, a conclusion to that story of the Sultan of the Indies:—we shall find that SHEHERZADI was saved from death, neither by her many amiable qualities, nor by her inexhaustible tales, but by her having, during the 'thousand and one nights,' borne the Sultan three children!" TREBUTIEN's translation, the result of the collation of twelve of the best manuscripts in Europe, confirms this; it is a *literal* translation of the one now under consideration; the passage occurs at the thousand and first night, and is unquestionably one of the most pathetic and beautiful in the whole work! To the above may be added the strong *internal* evidence deducible from the uniform character of the style throughout. The manuscript is open for general examination, and I shall gratefully appreciate the opinion and advice of competent orientalists.

With reference to my intention of publishing, we have great advantages in the mechanical facilities, which we can so readily command, in printing oriental works in this country; and a work of this kind, which would take many years in Europe, might be readily produced here in less than twelve months. We have our disadvantages too: for it is far from probable, that any editor could be procured *here*, possessing the high qualifications and the indefatigable industry of the Professor before named, united with the leisure necessary for the undertaking; one who would carry through the formidable labour of collation, of elaborate verbal criticism, and the compilation of a lexicon of words found in the original Arabic of this work, but in no other authority extant! We may despair of this; but it is not too much to say, that an edition, accurate in all essential particulars, may be brought through; and I will not conceal, that it would be a source of great gratification to me to be the means of giving to the classical literature of the East a book, which, while it has enjoyed throughout Asia and the civilized world a reputation equalled by none, has been, heretofore, in its complete and original form, but a *name!*

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* TREBUTIEN has since examined the MS. used by GALLAND, and finds that he possessed only two hundred and eighty-four nights.

Calcutta, September 5, 1836. C. Brownlow.

Resolved unanimously, That Mr. Brownlow is entitled to the warmest thanks of the Society, and of all interested in oriental literature, for his disinterested exertions in regard to the *Alif Leila,* and for his laudable wish to make public the valuable and complete edition he has become possessed of. As it seems possible, by further comparison of the manuscript with the recent translation of M. Trebutien, and with the Arabic printed version of Professor Habicht, and the incomplete volumes published in Calcutta, to add in some degree to the guarantee of its authenticity, the Committee of Papers is requested to enter upon this examination, and report upon the extent of patronage to be accorded by the Society to Mr. Brownlow's laudable enterprize.

A letter from M. Eugene Ormoult, Director of the French Journal entitled "*Institut,*" addressed to the President, invited the Society to communicate copies of its proceedings and publications to this Journal, and to subscribe for a copy of the work. Referred to the Committee of Papers.

A letter was read from Dr. F. Mohl, one of the Secretaries of the Asiatic Society of Paris:—

Referring to a prior official communication (not yet received) offering to unite with the Bengal Society in the expence of completing the oriental publications abandoned by the late Government of India, and in furtherance thereof requesting a supply of the works already finished for sale on the Society's account, it states that the five copies of the Mahabhárat sent home under charge of our associate M. Richy, had been sold in one day, and it was calculated that there might be a demand for 100 copies of this work on the continent, and for half that number of other Sanscrit works. The money realized has been paid to the Society's agent in London. Dr. Mohl concludes:—

"Nous ferons ici tout ce que nous pourrons pour repandre ces ouvrages en France et en Allemagne, car nous sentons tous vivement le service que la Société de Calcutta rend à la litérature orientale; et s' il m'est permis de parler de moi je ne desire rien plus ardemment que de pouvoir lui etre utile dans cette circonstance, ou elle a pris si energiquement et si honorablement les interets de la litérature orientale."

Library.

The following books were presented.

Transactions of the American Phil. Society—*by the Society, through Mr. Ryan.*

The American Almanack for 1836—*by ditto.*

HARLAN's Medical and Physical Researches—*by the Author.*

Transactions of the Geological Society of Pennsylvania, vol. i.—*by the Society.*

Transactions of the Hungarian Society of Pest—*by the Society.*

Transactions of the London Society of Arts, vol. i. pt. 2—*by the Society.*

Marsden's Numismata Orientalia, 2 pts. in 1 vol. 4to—*by the Author.*

Notes on the Indica of Ctesias—*by Professor Wilson, the Author.*

Epitome of the History of Ceylon and Translation of the Maháwanso—*by the Hon'ble G. Turnour, the author.*

Second Report on the State of Education in Bengal—*by Mr. W. Adam.*

Bell's Comparative View of the External Commerce of Bengal, during the years 1834, 35, and 36—*by the Author.*

The India Journal of Medical Science and Scientific Review—*by Dr. F. Corbyn, Editor.*

The Meteorological Register for July 1836—*by the Surveyor General.*

The following book from the Booksellers.

Lardner's Cabinet Cyclopedia—*Stebbing's Reformation,* vol. i.

Museum of Antiquities, &c.

Read, a letter from J. BELL, Esq, presenting various articles of food and clothing, in use among the savage tribes inhabiting the coasts of Dampier's Straits, brought to Calcutta by the Ship Bombay Castle.

The Secretary presented in the name of Lieut. COLIN MACKENZIE, various weapons taken from the Malay pirates;—among others a long bambu tube, through which light poisoned darts are blown by the mouth. The slightest wound inflicted by them is esteemed fatal. Lieut. MACKENZIE also presented the head of a pirate chief killed in the late expedition.

The Secretary called to the attention of the members present, a very curious piece of sculpture, sent down for the express inspection of his associates by Colonel STACY, a Member of the Society.

This sculpture (of 2-3rds size)—cut in the spotted red sandstone of Agra and Mathura. It seems to represent Silenus or Bacchus, his brows crowned with vine leaves, and supported by bacchanal attendants. The dresses of the figures, of which there are several on both sides very well proportioned and grouped, is decidedly not Hindu but rather Grecian, having a tunic of plaited folds gathered round the waist by a band. The figures and foliage support a large circular bason, which may have been for holding sacred water, or connected with a fountain. We must endeavour to make a drawing of this very interesting groupe, and publish it, with the zealous proprietor's account of its discovery.

Literary Communications.

A memoir by the Hon'ble G. TURNOUR on the authenticity of the early Buddhistical Chronology, developed in the *Páli* annals, as compared with the *Rája Tarangini* and other authorities, was submitted.

[This will be printed in an early number.]

A note on the *Muar* State, being the conclusion of his series of essays on the native divisions of the Malay Peninsula, and an outline of their several political and commercial relations, was received from Lieut. T. J. **Newbold**, A. D. C. to Brig. Gen. **Wilson**, C. B.

Extract of a letter from Mr. V. **Tregear** was read, offering should the Society wish it, to forward to Calcutta the *Bhitarí láth,* containing the important inscription which the Vice-President Dr. **Mill** is now engaged in decyphering, as it is held in no reverence or consideration by the people of the neighbourhood.

Some conversation took place on Mr. **Tregear's** proposition, which his letter explained would not have been made, if it involved the removal or destruction of an object of local interest or veneration. The pillar was at present isolated, half buried in the ground, and in no way regarded by the people. By transferring it to the museum it would be preserved from further injury, and an inscription of great historical importance would be rendered permanently accessible to the antiquarian. It was the concurrent opinion of the members present, that if the removal could be effected at a moderate cost, Mr. **Tregear's** obliging offer should be accepted.

Adverting to the neglected condition of the pillar lying half buried in the ground in the fort at Allahabad, and the great interest which the inscriptions it contains had excited among orientalists in Europe, it was

Moved by Sir J. P. **Grant**, seconded by Dr. **Corbyn**, that a respectful representation should be made to the Government of India, on the expediency of taking measures to preserve the ancient monument at Allahabad from further decay, by setting it up, with a pedestal and railing, in such position within the fort or elsewhere as may appear most appropriate.

Physical Department.

A letter was read from the Secretary to the Medical and Physical Society of Bombay, forwarding a memoir by Dr. **Lush**, on the Fossils recently discovered in the Gulf of Cambay.

The fossils have been sent to Calcutta by the Chief Secretary Mr. **Wathen**, and may be daily expected, when the paper will be printed.

Mr. J. **Trotter** presented some specimens of the fossil bones recently discovered at the Cape of Good Hope.

Mr. **Trotter's** note informs the Society, that Mr. **Pope**, the modest discoverer of this new fossil deposit, had kindly promised to collect a more numerous series for the Society's museum, to be presented in the name of his lady, and that they may be soon expected. The specimens now presented consist of vertebræ and fragments of ribs of some large animal, which from their mutilated state cannot be identified; they are thoroughly fossilized and very hard. Mr. **Pope** says they are found chiefly in the bed of the Ganka river, whither they have been washed from the site of their inhumation in a "sandy and slate stone" soil: one specimen in his possession was found imbedded in this hard slaty matrix, from which it required a crowbar to extract it; it was as one solid rock. The vicinity of the district called the "Gouph" abounds with specimens; the country is stony and barren, and much intersected with dry ravines. It is situated between the *Zwarteberg* and the *Nieuwbergen,* the central part of the Cape Colony, Lat. 33° S. and 22°, 23° W. Long.

A memoir on the fossil remains of the smaller Carnivora of the Sub-Himálayas, by Lieutenants W. E. **Baker** and H. M. **Durand**, Engineers, with a lithograph, was submitted.

Description of some new species of the Strigine family; and indication of a new genus of the Picidæ, by Mr. B. H. **Hodgson**.

A specimen of the sea-horse *(Hippocampus)* called by the *Mag* inhabitants of Ramrí a young *Ngaga*, or "volcano serpent," was presented by Captain D. **Williams**, Senior Assistant Commissioner in Arracan.

Dr. **McClelland** exhibited to the Society the collections made by him, of Zoology and Geology, in the late expedition to the Tea province of Asám, and submitted two written notices, one of which he read in elucidation of the geology of the Kasia range.

Dr. **McClelland** stated, that the fossil shells were found in such numbers and variety at *Chirra Punji*, as to afford the most unquestionable evidence of the tertiary nature of the Kásia mountains: and further, that when the species shall be rigidly identified and compared with those of the London and Paris basins and the sub-Appenine beds, as well as with existing species in the Indian seas, it may be possible to find their place in the *Eocene* and *Pliocene* divisions of **Lyell**.

This he considered the first instance of any extensive deposit of fossil shells having been found in sub-Himalayan beds, calculated to throw sufficient light upon the period of upheavement.

Mr. **Cracroft**, and long before him Mr. **Scott**, had indeed made known the cerithia and turrilites of Chirra, and a variety of the nummulites of the Sylhet limestone, which is in fact made up of shells and nothing else; but to Dr. **McClelland** belongs the honor of having found 27 varieties of shells in the same limestone; also, of having found an extensive deposit of marine shells on the S. W. face of the mountains quite distinct from any limestone whatever, but imbedded in a superficial layer of partially consolidated sandy matter, which reposes on the surface of sandstone covered only by the soil, and of having exhibited 100 species nearly of these shells for the first time to the Society.

The great extent of the collection and the variety of objects of natural history particularly—embracing 120 fishes of the Brahmaputra; besides birds, quadrupeds, insects, shells, and a very numerous and regular series of rock specimens taken from the whole line of journey,—did great credit to the industry of Dr. **McClelland**. A vote of thanks was unanimously passed to him for the opportunity he had so kindly afforded the Society of inspecting his portion of the fruits of the late expedition to Asám. The descriptive catalogues of the whole are now in a state of forwardness, and will, it is presumed, be incorporated in a general report to Government by Dr. **Wallich**, who conducted the expedition, and it is hoped be eventually published for general information, either in a separate volume, or through the medium of the Society's Researches.

[We shall hasten to insert the two notes as soon as space permits.]

VII.—*Meteorological Register.*

Meteorological Register kept at the Assay Office, Calcutta, for the Month of August, 1836

Day of the Month	Observations at 10 A. M.							Calculated Humidity			Observations at 4 P. M.							Calculated Humidity			Register Thermometer Extremes		Rain	Wind		Weather.	
	New Stand. Barometer red. to 32°.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet bulb	Do by Leslie's Hygro.	Dew point.	Hair Hygrometer.	Centesimal tens. of vapour by wet bulb.	Ditto by dew point	Do by hair Hygrom	New Standard Barometer	Old Stand Barometer at 32°	Thermometer in air	Depression of wet bulb	Do by Leslie's Hygro	Dew point	Hair Hygrometer	Centesimal tension of vapour by wet-bulb.	Ditto by dew-point	Do by hair Hygrom	Cold on roof	Heat in sun.	Rain	10 A. M.	4 P. M.	Morning.	Evening.
1	29,543	29,590	83,1	3,4	3,3	76,2		82	80		29,439	29,593	85,6	5,2	4,3	76,6		75	73		74,5	95,8	,10	SW.	S E	cum. strat	hazy.
2	,624	,683	85,1	5,8	5,0	75 5		78	73		,532	,603	87,1	5,5	4 6	76,0		75	70		75,0	96,5	,05	SW.	se.	do	cum. str.
3	,633	,696	86,5	6,1	5,4	76,3		75	80		,514	,598	88,9	8,7	8,6	74,7		63	62		75,0	98,2		s.	se	do fine	hazy.
4	,587	,630	86,7	8,6	7,8	74,5		60	68		,484	,548	85,3	4,6	4,3	76,5		60	76		76 2	103,2	,35	S.	se.	fair.	threatening
5	,545	,599	86,3	5,2	5,0	77,7		75	75		,407	,480	90,9	8,3	7,6	76,5		65	64		76,0	116,0		se	ese.	cum. strat.	cir cum
6	,449	,512	88,2	6,2	5,6	77 0		72	70		,327	,391	87,4	5,7	4,7	78,7		75	76		78,2	103,8	,05	se	se.	do	showery.
7	,382	,435	86,7	5,4	5,4	76 5		75	72		,274	,325	87,0	4,9	4,0	77,5		77	74		77,0	105,0	,35	S. E.	e.	cum.	rain
8	,351	,393	86 4	4,6	4,2	77 5		80	75		,241	286	87,1	4,3	4,0	79 6		80	78		75,2	97,8	,35	E	E.	cldy	showery
9	,363	,410	86,9	4 5	4,4	77,4		80	74		,310	,362	86 2	4 6	3,5	76,6		80	74		77,8	91,0	,30	ES. E.	ese.	hazy.	overcast.
10	,572	,563	85,9	4,1	3 5	75 0		82	72		,448	,496	86,9	4,2	3 0	76,5		80	73		76,2	91,0	,25	ES. E.	S. E.	showery.	rain.
11	,540	,582	85 7	4,5	4,3	76 7		80	76		445	,494	88,7	6,1	4,6	77,0		72	69		76,2	97,5	,10	se.	se.	cum. fine.	do
12	,571	,614	86,8	5,1	4,7	76,6		80	73		,455	,514	90 9	8,4	6,8	79,0		65	69		76,2	83,9		se.	se.	do	cum.
13	,600	643	85,1	4,6	4 8			78			,494	,542	85,5	4,2	4,0	77,3		80	77		77,0	95,4	,20	E.	E.	do	showery.
14	,566	,620	85,8	5,0	3,5	78 0		65	78		,461	,523	87,3	4,8	4,8	76,6		79	76		76,7	97,9	,65	se.	se.	do	do
15	,523	,582	86,6	6,1	5,2	75,8		75	71		,396	,464	87 5	5 8	5,1	76,5		72	70		76,8	112,5		se.	se.	do	do
16	,484	,544	87,5	4,8	4,6	77,0		80	72		,480	,452	87,9	5 4	4 0	77,3		75	72		78,2	100,5		se.	e	do	do
17	,564	,622	87,3	5,2	5,3	75 0		75	68		,478	,542	87,5	4,9	4,4	78,3		77	74		78,2	99,1	1,50	se	se.	hazy	overcast.
18	,541	,596	86,3	4 6	3,8			82			,446	,512	88,7	6 6	5 2	75,6		70	66		74,7	101,0		ne.	ne	cumuli.	showery.
19	,489	,547	85 3	3,9	3 7	77,2		82	77		,363	,432	88,5	4,5	4,0	77 6		80	71		77,2	110,0	,55	ne.	ne	do	do
20	,440	,490	86 4	5,2	4 7	77,5	90	80	76	78	,298	,380	91,2	8,8	7,2	77,3	85	62	65	68	76,2	100,0		e	o	do	do
21	,329	,388	84,5	3,0	3,0	80,0	95	85	87	88	,227	,280	84,2	3,5	3,8		94	80		67	76,4	85,0	1,25	ne.	S.	rain	rain.
22	,411	,453	83,5	3,5	2,5	77,8	95	87	84	88	,353	,415	86,5	4,7	4,0	78 0	92	80	77	82	76,2	93,5	,30	se	se.	overcast.	showery.
23	,529	,586	85,9	4,0	3,7	77,5	93	82	77	84	,435	,496	85 6	4,2	4,0	77,5	94	80	77	87	75,0	99,3	,20	S E.	se.	fine	do
24	,544	,604	86,9	5 0	4 2	77,8	91	80	75	80	,374	,460	85,3	5,0	4,2	78 0	90	77	80	78	76,0	103,6		S. E	se.	showery.	do
25	,399	,453	84,7	4,4	4,0	77,0	92	80	81	82	,285	,338	86,5	5,1	4,6	76,6	92	77	74	82	75,3	84,2	,35	S. E.	S.	cloudy	do
26	,327	,568	81,2	2,9	3,2	76,2	94	85	85	87											73,0	85,0	4,00	se.	—	hd. rain.	do
27	,690	,743	84,1	3,5	3,4	76,7	94	85	79	87	,571	,634	86,7	7,1	6,0	75,5	87	67	66	72	74,5	95,5	,10	S. W.	S. W.	overcast.	fine.
28	,641	,678	85,8	4,0	4,0	79,0	91	82	78	80	,522	,535	89,7	9,7	8,5	73,5	82	57	60	63	78,2	104,0		S W	S. W.	fine.	do
29	,553	614	86,3		5 0	76,5	89	77	74	76	,447	,503	89,4	4,5	4,7	76,2	90	80	71	78	77,8	111,2		S. W.	S. E.	cum. str.	showery.
30	,531	,536	85,9	4 9	4,1	76,4	91	80	74	80	,437	,499	87,1	4,1	4,2	77,3	92	82	74	82	77,4	111,6		S.	S. E.	do	do
31	,555	,611	85,5	4 5	4 7	77,3	91	80	75	80	,452	,513	86,1	4,8	4 3	77,7	92	77	77	82	75,8	101,2	,35	S. E	S. E.	hazy	do
Mean,	29,517	29,543	85,8	4,7	4 4	76,9	92	79	76		29,414	29,472	87,5	5,6	4,9	77,1	90	74	72		76,3		11,35	lightsoutherly		sultry weather.	

The remarks of last month apply to the barometers. The differences have been .032 and .048 at 10 A. M. and 4 P. M. respectively, agreeing with former observation. The *Wet-Barometer* column has been omitted this month to make room for a daily comparison (which will be continued) of the three methods of finding the percentage of humidity in the air. The first column is taken from the table for the wet bulb instrument inserted in the July number. The second column is calculated from Dalton's table of aqueous tension;—dividing the tension at the dew point by the tension at the temperature of the air. The third is taken from my table for the hygrometer published in the Royal Institution Journal and in the Oriental Magazine for June 1827. It should be noted that (where not observed by myself) there is a tendency to estimate the dew-point a little below the truth, which makes the calculated dryness too great.—J. P.

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JOURNAL

OF

THE ASIATIC SOCIETY

No. 57.—*September,* 1836.

I.—*Examination of some points of Buddhist Chronology. By the Hon.* GEORGE TURNOUR, *Ceylon Civil Service.*

While the question of the authenticity of Buddhistical chronology, developed in PALI annals, subsequent to the advent of SA'KYA SINHA, is under the consideration of the Committee of Papers of the Asiatic Society, I beg to offer a few observations on the Chronological Table appended to Professor WILSON's Essay on the Hindu History of CASHMIR, called the *Rája Taranginí,* published in the XVth volume of the *Asiatic Researches.*

The first portion of this history, compiled by KALHA'NA Pandit commences with the fabulous ages; it is represented to extend to A. D. 1024; and the author is reputed to have flourished about Saka 1070, or A. D. 1148.

Before tabularizing and adjusting the chronology comprised in that history*, Professor WILSON gives the following details regarding the reign of the monarch ASO'KA.

"The last of these princes *(Sachinara)* being childless, the crown of *Cashmir* reverted to the family of its former rulers, and devolved on ASÓKA, who was descended from the paternal great uncle of *Khagendra.* This prince, it is said in the *Ayen Acberi,* abolished the Brahminical rites, and substituted those of *Jina;* from the original however it appears, that he by no means attempted the former of these heinous acts, and that, on the contrary, he was a pious worshipper of *Siva,* an ancient temple of whom in the character of *Vijayésa* he repaired. With respect to the second charge, there is better foundation for it, although it appears that the prince did not introduce, but invented or originated the *Jina Sásana.* He is said to have founded a city called *Srinagar,* a different place, however, from the present capital, which is attributed to a much later monarch. In the reign of ASÓKA, *Cashmir* was overrun by the *Mlech'has*, for whose expulsion the king obtained from *Siva* a pious and valiant son, as a reward for the austerities he had practised *."

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* Want of space must excuse our inserting these tables, which will be accessible to all our readers in our Chronological and Genealogical Appendix.—ED.

"JA'LOKA, the son and successor of ASÓKA, was a prince of great prowess: he overcame the assertors of the *Bauddha* heresies, and quickly expelled the *Mlech'has* from the country, thence named *Ujjhita dimba*: he then carried his victorious arms to foreign regions, and amongst others to the north of Persia, which he subjugated in the reign of DARAB, and then proceeding in an opposite direction, he subdued the country of *Canouj*."

"The successor of this celebrated monarch was DAMODARA, of whose descent various opinions were entertained."

"DAMODARA was succeeded by three princes who divided the country, and severally founded capital cities named after themselves. These princes were called HUSHKA, JUSHKA, and CANISHKA, and these appellations are strongly corroborative of an assertion of our author, that they were of Turushka, that is, of *Turk* or *Tartar* extraction: they are considered as synchronous, but may possibly be all that are preserved of some series of Tartar princes, who, it is very likely, at various periods, established themselves at *Cashmir*. The chief event recorded of their reign is the foundation of the three several capitals, named after themselves, *but another and more important consequence of their sovereignty is said to have been the almost entire change of the national faith, and the nearly exclusive prevalence of the doctrines of the Bauddhas under a Bodhisatwa or heirarch named* NA'GA'RJUNA. *The period at which this took place is said to have been* 150 *years before the death of* SA'KYA SINHA."

"The *Tartar* princes were succeeded by ABHIMANYA, a monarch evidently of a Hindu appellation, and a follower of the orthodox faith, which he re-established in *Cashmir*."

In elucidation of the date assigned to the age in which NA'GA'RJUNA lived, Professor WILSON adds the following appendix. The Sanscrit quotation, which (if I have correctly read it) is here represented in Roman, is there given in Déva-nágari characters.

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* The faith of ASÓKA is a matter of very little moment, as the prince himself is possibly an ideal personage: as, however, the comparative antiquity of the Buddha and Brahminical creeds in *Cashmir* has been supposed to be affected by it, and the events subsequently recorded, it may be advisable to give the passages of the original, which shew that ASÓKA was a worshipper of SIVA: it is not impossible, however, if we are to attach credit to any part of this portion of the Cashmirian history, that he permitted heretical, possibly *Bauddha* doctrines, to be introduced into the kingdom during his reign from his Tartar neighbours.

"Then the prince ASÓKA, the lover of the truth, obtained the earth; who sinning in subdued affections, produced the *Jena Súsana*." This may mean possibly something very different from the received idea, and may imply his neglect of affairs of state through excess of devotion, and his consequently omitting to prevent the intrusion of a foreign power, rather than a foreign faith, into the kingdom, the expulsion of which was the object of his son's birth.—[Note by Professor WILSON.]

" Appendix No. 7, to Professor Wilson's Essay.

" The passage in the text adverted to (page 23) requires a little consideration, both as to its meaning and the chronological views to which it has already given rise. The text of the original runs thus :—

Té Turushkánwayódbhútá pi puṇyásrayá nripáh Sushkakshétrádi déséshu maṭhachītyádi chakriré. Prájyé rájyakshané teshán, práya Kasmiramardala*m* bhójyamasté sawauddhána*m* pravrajyorjíta téjasa*m*. Tató Bhagawatah Sa'kya Sinhasya puranirvrité asmin saha lókdhatau *sárdham varshasatam* hyagát Bódhisatwascha désésmin néka bhuméswaró bhut, sacha Na'ga'rjunah srímán shaḍarhatwa na sanṣrayé.

" There are in this passage some obvious inaccuracies, and some compounds of a purport absolutely unknown to the most learned Brahmans. Taking it as it stood, it appeared to involve the position that the *Turushka* princes *preceded* Sa'kya Sinha by above a century and a half; and concluding the Gautama of the sixth century before the Christian era to be intended by the name Sa'kya Sinha, which is always enumerated as a synonime, the date of Gonerda III. was adjusted accordingly in the preceding pages, and placed 640 B. C. An opportunity having subsequently occurred of consulting a Burma priest, and a man of some learning, on the subject, there appeared good grounds for revising the passage, and altering the results, in consequence of which several pages previously printed off have been cancelled, and it is only in the marginal dates of the first dynasty that any traces of the error have been suffered to remain. These are of comparative unimportance, and will be readily rectified by adverting to the table. We have now then to offer a translation of the passage; premising, that the term *Puranirvrité* should be *Parinirvrité*, the sixth case of *Parinirvriti*, or in Pali, *Parinibbuti*, the ordinary term used by the Bauddhas, to express the final *Nirvritté* or emancipation of their Buddhas or saints in its fullest sense; *Pari* being added as an intensitive prefix. The use of this and some other peculiar expressions, which are at present quite unintelligible to the ablest scholars among the brahmans of Hindustan, but are familiar to the Rahans of the Burman empire, proves that Kalha'na, the author of the Cashmirian History, or at least his guides, were well acquainted with the language, and, probably, with the system, of the Bauddhas.

' They (Hushka, &c.) of *Turushka* descent, were princes, asylums of virtue, and they founded colleges, and planted sacred trees, in *Sushka* and other places. During the period of their reign the whole of Cashmir was the enjoyment of Bauddhas, eminent for austerity. After them, when 150 years had elapsed from the emancipation of the Lord Sa'kya Sinha in this essence of the world, a *Bódhisatwa* in the country named Na'ga'rjuna, was *Bhumiswara*, (Lord of the earth,) and he was the asylum of the six A'rhatwas.'

" As the prevalence of the *Bauddhas* and consequence of Na'ga'rjuna, if not subverted, were at least checked in the ensuing reign of Abhimanya; and as the passage expressly states that the circumstance occurred after the *Turushka* princes, the 150 years subsequent to Sa'kya Sinha must fall within the limits of Abhimanya's reign: it is therefore necessary only to fix the date of Sa'kya Sinha to determine that of the several reigns occurring in this portion of our history.

Assuming that this Sákya Sinha was the Buddha of 542 B. C. he ventures to correct thereby Kalhána's more distant epoch :—

"At the same time KALHA'NA, well informed as he is in these respects, has evidently confounded the two periods, and hence assigned to SA'KYA SINHA a date corresponding to at least 1332 B. C. although apparently designating the person who flourished B. C. 542. *We may therefore venture to correct his chronology with reference to this latter date;* although until we can be satisfied that the SA'KYA SINHA of the North-west was one individual with the GAUTAMA of *Magadhá*, we cannot venture to attach any thing like certainty to this emendation. Some circumstances in favor of the date laid down are adverted to in the concluding observations; and we may here add, that there seems to be a strange connexion between the circumstances and dates of the *Zerdashts* of Persia and the *Buddhas* of India, which deserves a more particular investigation than we have hitherto had materials to undertake.

"*The passage relating to the prevalence of the Bauddha faith in Cashmir includes the mention of an individual,* WHOSE HISTORY IS FULLY AS OBSCURE, IF NOT AS IMPORTANT, AS THAT OF BUDDHA.

"NA'GA'RJUNA as a *Bodhisatwa*, (see note in page 21,) may be either a religious or a secular character: he was probably the former, as a hierarch, the prototype of the modern Lama of *Tibet;* his other title, however, *Bhumiswara** may mean a prince, and has probably induced Mr. COLEBROOKE to translate the text generally thus:—

"DA'MODARA was succeeded by three kings of the race of *Turushka*, and they were followed by a *Bodhisatwa*, who wrested the empire from them by the aid of SA'KYA SINHA, and introduced the religion of *Buddha* into *Cashmir*. He reigned a hundred years, and was followed by *Abhimanya*."

After carefully considering all the data accessible to him, Professor WILSON decides on adopting the above Buddhistical record of the age in which these three *Turushka* princes and NÁGÁRJUNA flourished, as the most authentic authority available for making the first adjustment in his chronological table; whereby he reduces, at the termination of his "first period," the date of GONERDA III.'s reign from B. C. 1182 to B. C. 388, showing an anachronism in the *Rája Tarangini* of 794 years.

This circumstance alone, even if no new light could be thrown on this interesting question, would afford a powerful argument in support of the opinions I entertain of the superior accuracy and authenticity of Buddhistical over Brahminical chronology. We should bear in mind, too, that the *Rája Tarangini* is admitted to be "the only Sanscrit composition yet discovered to which the title of history can with any propriety be applied." It is not a little remarkable, therefore, that Professor WILSON, after having thus recognized the correctness of the date assigned to SÁKYA SINHA's death, and availed himself of an event connected with Buddhistical history to correct the chronology of the *Rája Tarangini*, should have entirely lost sight of these circumstances, and been led, in analyzing the *Tibetan* works, to say that " any thing like chronology is, if possible, more unknown in Buddhistical than Brahminical writings, and it is in vain to expect any satisfactory specification of the date at which BUDDHA SÁKYA flourished."

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* "*Iswara*," (Pali "*Issaró*,") and "*Sámikó*," are often conferred on Buddhistical sacerdotal characters who have gained great ascendancy. Vide chap. v. of the *Mahávanso.* "*Addháyan sámanéró mé gharé hessati* SA'MIKÓ." Chap. xiv. "*Gahetá pathawi mihi: Dipé, hessanti* ISSARA'." "This samanéro will this very day become the master of my palace." "The land will be usurped by these persons: they will become the lords of this island." (Note by Mr. T.)

The object, however, which I have more immediately in view at present, is to point out, that the correction adopted by Professor WILSON in this table, which reduces the date of the reign of GONERDA III. from B. C. 1182 to B. C. 388, invites criticism and reconsideration, as being apparently inconsistent with the most approved data previously established, in both the Brahminical and Buddhistical chronologies; and also to endeavour to prove that the imperfection of the adjustment proceeds from the omission of a *single letter* in the passage of the *Sanscrit* text quoted in his appendix. Whether the omission of this single letter has arisen from KALHÁNA Pandit having misunderstood the Buddhistical authority, from which his information was derived; or from the inaccuracy of some transcriber of his work, will not, perhaps, ever be ascertained; unless, indeed, some copy of this history be hereafter found, exempt from this minute inaccuracy, the discovery of which would fix the erratum on the transcriber.

Before I explain the grounds on which I justify the addition of "*d*" to the numeral " *Sárdhán warsha satań*," it will be proper to notice, why the adjustment, made according to the present reading of that numeral, is inconsistent with " the present most approved data of both the Brahminical and Buddhistical chronologies."

According to the Brahminical chronology developed in the *Puránas*, as analyzed by Sir W. JONES, Colonel WILFORD, and other oriental scholars, the date assigned to the reign of CHANDRAGUPTA is B. C. 1502; and whether we regard him as the contemporary of ALEXANDER the Great, or of SELEUCUS NICATOR, the Brahminical date assigned to his reign will have to be reduced to about B. C. 325; making an adjustment of about 1177 years; in comparison with which the foregoing adjustment of 794 years at the reign of GONERDA III. is deficient to the extent of 383 years, and to that extent, therefore, it is at variance with the present cardinal point of Brahminical chronology, the age of CHANDRAGUPTA. On a careful comparison of Professor Wilson's Table with Sir W. Jones's Essay, it will, I think, be admitted that Kalhána Pundit did not depart materially from the fictitious scheme of Hindu chronology contained in the *Purànas,* until after the reign of Gonerda III.; and that it was subsequent to that date, that he attempted to correct progressively the Hindu anachronism. According to the *Purànas,* Chandragupta succeeded to the *Magadha* empire about B. C. 1502. Admitting (for reasons hereafter explained), that Asóka of *Cashmir* is identical with Asóka of *Magadha,* the grandson of Chandragupta, we shall then have a series of nine (three of *Magadha* and six of *Cashmir)* princes to fill up the term of 320 years intervening between Chandragupta B. C. 1502, and Gonerda III. B. C. 1182, giving a somewhat high average, certainly, of 35 years and seven months, but still not greatly out of proportion with the term actually assigned in Buddhistical history to the reigns of the three *Magadha* kings, (viz.) ;—

Chandragupta,......	34
Bindusara,..........	28
Aso'ka,.............	37

99 ÷ 3 = 33 years for the average

At all events, it must be conceded that a series of only nine reigns, comprised within so limited a term as 320 years, can by no admissible process of adjustment be extended to 703 by the addition thereto of 383 years short deducted at the age of Gonerda III. Such an addition would make it necessary either to throw back the reign of Chandragupta to (B. C. 1182 + 703=) B. C. 1885, which would disturb the whole scheme of Hindu chronology, or to bring the reign of Gonerda III. (B. C. 1502—703) to B. C. 799, which Kalha'na had not done.

It appears to be requisite, therefore, that the adjustment made in the date of the reign of Gonerda III. should be nearer 1177 than 794 years; and, indeed, I conceive I am justified in asserting, that this position admits of almost arithmetical verification, from the inequalities of the averages produced in the reigns of the three *subsequent* "dynasties" in the Chronological Table of the *Ràja Tarangini.*

It will be seen in that Table, that Professor Wilson does not escape from his chronological embarrassments till the close of his "third dynasty;" as the averages assigned to two of those dynasties are, by his own acknowledgment, inadmissible. According to his *corrected* chronology he has

In the first dynasty, ..	21 Princes in	378 years,	average 18 years.
In the second dynasty,	6 ditto in	192 ditto,	ditto 22 ditto, 8 months.
In the third dynasty,	16 ditto in	433 ditto,	ditto 43 ditto, 3½ ditto.
	37	1003	general average 27 years, 1 month.

If, instead of resting these adjustments on conjectural grounds, we substitute the precise correction ascertained to be necessary in Hindu chronology at the reign of CHANDRAGUPTA, being about 1177 years, we shall then bring the reign of GONERDA III. from B. C. 1182, down to B. C. 5. The general average of the reigns of the 37 Kashmerian princes from GONERDA III. in B. C. 5 to the end of the reign of BA'LADITIYA in A. D. 615, will then give the satisfactory result of 16 years and 9 months. The necessity of all further adjustments of the Cashmirian table, subsequent to the age of GONERDA III. will be thereby got rid of. The clumsy expedient of KALHA'NA Pandit for making those adjustments, by assigning preposterously protracted terms,—in one instance of 300 years,—to the reigns of the princes of the three subsequent "dynasties," may at once be rejected. *His* chronology down to the reign of GONERDA III. will be rendered consistent with the Purânas; and *our* adjustments will be in accordance with the anachronism ascertained to exist in the age of CHANDRAGUPTA.

As regards the Buddhistical chronology, I have it in my power to adduce *direct* evidence, independent of *hypothetical* reasoning, in support of the proposition which I have advanced.

It can hardly be necessary for me to bring forward proofs, beyond those exhibited in the foregoing extracts from Professor WILSON'S Essay, to establish, that ASO'KA, "to whom the crown of *Cashmír* reverted on the demise of SACHINARA without issue, was the *Magadha* prince of that name, the grandson of CHANDRAGUPTA and son of BINDUSA'RA, who became the great patron of Buddhism after his accession to the supreme sovereignty of India. It is found in the *Attakathá* on the *Pitakataya* (the commentaries on the Buddhistical Scriptures) as well as in the *Mahá Wanso**, that this prince administered the government of *Ujjéni*, by the appointment of his father BINDUSA'RO, the emperor of India; that he succeeded to the empire in the year 218, after the death of SA'KYA, or B. C. 325; that he became a convert to Buddhism four years after his accession, and that the mission for the conversion of *Cashmír* was deputed by him, in the 18th year of his reign, after the termination of the third convocation, in A. B. 236 or B. C. 307. The particulars given of the rule of this prince in *Cashmír*, concise and imperfect as they are, entirely accord, as far as they go, with the foregoing sketch. According to that sketch, ASO'KA is not the direct descendant of his predecessors who reigned in *Cashmír*; "he was originally a pious worshipper of *Siva*, but subsequently invented or originated the *Jina Sásana*" (religion of *Jina* or *Sákya)*; and, according to the *Ayin Acberi*, "abolished the Brahminical rites and substituted those of Jina." With these marked features of resemblance, of peculiar and prominent importance in the tableau of Indian History, which are not recognizable in, or applicable to, any other Asiatic monarch, it appears to be impossible to withhold the admission that the ASO'KA of *Cashmír*, and the ASO'KA of *Magadha*, subsequently called *Dhammásóka*, the emperor of India, are identically one and the same individual.

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* Vide Ch. V. As ASO'KA'S son, MAHINDO, was born while his father "administered the government of *Ujjéni*," and as MAHINDO is stated to have attained his twentieth year in the seventh year of ASO'KA'S rule in *Magadha*, ASO'KA must have governed *Ujjéni*, for his father BINDUSA'RO, at least fourteen years. It is immaterial, as regards the foregoing computation, whether his accession to *Cashmír* preceded or followed his accession to the *Magadha* empire, as my calculations are based on the date of the "Third Convocation" in B. C. 307.

If on this *hypothetical* reasoning, the point of identity may be considered to be established, (and I observe by your Genealogical Tables that it is there admitted,) we have to add 20 years for the residue of the reign of ASO'KA, from the date of the Buddhist mission to *Cashmír* in A. B. 235, or B. C. 307, to complete his reign of 37 years in *Magadha*, which brings us to B. C. 287, leaving a term of 282 years between that date and B. C. 5, to which the reign of GONERDA III. was brought, according to the foregoing adjustment (made on Brahminical chronological data) to be divided amongst the six princes who intervened between ASO'KA and GONERDA III. These numbers will give an average of 47 years for each reign, which is certainly inadmissible. This discrepancy, however, only serves to give me greater confidence in the views I entertain; and, indeed, if such a result was not produced, in this particular portion of Buddhistical chronology, the whole of the reasoning entered into in the introduction to my pamphlet, on which I have attempted to prove "that an intentional perversion to the extent of about 60 years has been adopted, to answer some national or religious object, which is not readily discoverable, between the date of SA'KYA SINHA's death and that of the accession of CHANDRAGUPTA," would be nullified. By deducting these 60 years, about 222 years will be left to be divided among those six princes, which gives an average of 37 years, which also is far from being a satisfactory result. But a single protracted reign, in so limited a number as six monarchs, would be sufficient to reduce the average of the other five reigns to an admissible term, and would, at the same time, adjust the date of ASO'KA's reign in the *Rája Tarangini* to the date assigned to it in Buddhistical chronology, as well as produce the same result with that arrived at by the foregoing adjustment of the Brahminical chronology,—viz. fix the age of GONERDA III. to about B. C. 5.

In the translation of the foregoing *Sanscrit* quotation, on the authority of which Professor WILSON's adjustment of the age of GONERDA III. from B. C. 1182 to B. C. 338 is founded, I have ventured to make a few verbal alterations, unconnected with the date, in conformity with the meaning which Buddhistical phraseology would suggest. From the context with the other portions of the work, it may be perfectly just to apply the term "*pravrajyarjita*" to "Bauddhas" exclusively; and M. CSOMA DE KÖRÖS corroborates, from Tibetan authorities, the inference that these Tartar princes were of the Buddhistical faith. But that term in Buddhistical literature signifies, in the most general sense, "ascetic," without distinction of any particular religion. The impression conveyed to my mind by this passage is rather to the effect that "*Cashmir* was under the spiritual controul of (Brahminical) ascetic sages, eminent for their rigid piety," than that "*Cashmir* was the enjoyment of Bauddhas eminent for austerity" during the reigns of the three *Turushka* princes.

The correction made by Professor WILSON from "*Puranirvritté*" to "*Parinirvrité*" is indispensable; and had the Burma priest, whom he consulted, called to his recollection that *Majjhantiko théro* did not repair to *Cashmír* for the purpose of converting it to Buddhism, until 236 years *after* the death of SA'KYA SINHA, he would doubtless have also pointed out that, according to Buddhistical authorities, there was as great an irrelevancy and inadmissibility involved in the specified date of 150 years, as in computing that date "*anterior*" instead of "*posterior*" to the death of BUDDHA.

This manifest inaccuracy is to be rectified by prefixing "*d*" to the "*sárdhan varsha satan,*" and converting it into "*dasárdhan varsha satan**." In making the addition of this single letter, it must not be regarded as an arbitrary alteration on my part. It is a correction, the adoption of which cannot be resisted without impugning the authority of authentic Buddhistic history, in which "Na'ga'rjuna" (as Professor Wilson himself surmises) under the name of "Na'ga Se'na" enjoys a distinguished celebrity. He does not appear ever to have visited Ceylon, and as the *Attakathá* extant here only comprise a *continuous* record of Indian events up to the period when the third convocation was held in A. B. 236 or B. C. 307, while he himself flourished in A. B. 500 or B. C. 43, the only record of Na'ga' Se'na in this island, (as far as I am aware,) excepting some unconnected allusions to him in *Buddhaghósós Attakáthá*, is the *Milindapanno* (commonly called *Milinapprashno)*, a work which derives its title from his dialectic controversy with Milindu the rája of *Ságalá*. In that work, from which I shall presently make some extracts, it is specifically stated that he appeared (in fulfilment, of course, of an assumed prediction of Sa'kya Sinha) *five hundred* years after the death of Buddha; and that work, moreover, contains the names of the *six Arhatwas*, (Páli *Arahantá*,) who, most fortunately for the illustration and substantiation of my case, are referred to in the four apparently insignificant words with which this *Sanscrit* quotation concludes. In Professor Wilson's translation of these four words, the negative "*na*" has been overlooked, and he has rendered them into "he was the asylum of the six *Arhatwas*," instead of translating them "he did not recognize," i. e. he denounced, "the six *Arhatwas*."

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* I should here note that I have never met in my *Páli* reading, nor has any native scholar been able to refer me to, the numeral "*Saddhan-sata*" for "one hundred and fifty;" although, according to grammatical rules, the contraction of "*Saha-addhán-sata*" into "*Saddhan-sata*" appears to be perfectly admissible. Whereas the numeral "*Dasaddhasata*" contracted from "*Dasa-addhán-sata*" for "half a thousand," is in continual use. It is repeatedly met with in the *Mahâwanso*, Ch. I. "*Sámuddé Nágabhawané dasaddhasata yójané.*" "In

With these explanatory remarks, I venture to offer the following translation of this valuable *Sanscrit* quotation.

"They (Hushka, Jushka, Canishka) of *Turushca* descent, were princes asylums of virtue, who founded colleges and chetiyas in *Suscha* and other countries. During the entire period of their rule, the whole of *Cashmir* was under the spiritual controul of ascetic sages, eminent for their rigid piety. Thereafter, when (half a thousand) five hundred years had elapsed in this (land), as well as the whole world, from the period that the sanctified Sa'kya Sinha attained *Parinirvritti*, the pre-eminently endowed *Bódhisatwa*, Na'ga'rjuna, became the (spiritual) lord of this and many other lands, and did not recognize (i. e. denounced) the six *Arhatwas* (who were his contemporaries)."

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a Nága kingdom, half a thousand (five hundred) yójanas in extent, bounded by the ocean." Ch. V. "*Purisánán dasaddhéhi satéhi pariwarito*:" "attended by retinue of five hundred men." I am not aware whether this remark be applicable to the *Sanscrit* language also; nor does it appear to me to be material, as Kalha'na probably quotes from a *Pali* Buddhistical work.

The general history of NA'GA SE'NA, to which the *Milindapanno* refers, although it *could* throw no light on the history of Buddhism in Ceylon, in as much as Buddhism was established in this island 264 years *before* the period of his ministry, and as he himself never appears to have visited it, is nevertheless a work, the value of which, as regards the Buddhistical history of India, cannot well be overruled, and for the recovery of which, if still extant in the regions mentioned by Colonel TOD and Lieutenant WEBB*, no pains should be spared. It is reasonable to infer, from the tenor of the *Milindapanno*, that his triumph over MILINDU rája was either his principal achievement, or that which most contributed to his renown; but the mention made of him in the *Rája Tarangini* presents conclusive evidence of the sphere of his influence and ministry not having been confined to that triumph; and the circumstance of the *Milindapanno* commencing with a quotation from a more general work, affords equally conclusive proof that such a history of his life had once been extant. The *Milindapanno* being incomplete, neither the date at which, nor the individual by whom, it was compiled from pre-existing works, is specified in it. The following is a literal translation of its commencement.

"Adoration to him, who is the sanctified, the deified, the omniscient, supreme BUDDHA!

"In the capital city, *Ságalá*, MILINDU approached NA'GA SE'NA, as a river approaches the ocean. That monarch having selected him who was endowed with the power of enlightening the darkness of ignorance, as if he were a meteor-bearer, proposed certain profound questions (to him) involving the great principles of right and wrong."

"There (in reference to that quotation) do ye (my hearers) devoting your undivided attention to, and preparing your minds to be favorably impressed with the subject, listen to these profound and doubt-dispelling dissertations, which, as well from the questions suggested as from the solutions rendered, their deep import, and connected consistency, their influence over the passions and charm to the ear, (are) unprecedented, and make the hair stand on end (with amazement); portraying them, from the similitudes and parables used by NA'GA SE'NA, as if immersed in the (waters of) the '*Abhidhamma*' and '*Wineyo*,' secured (at the same time) in the meshes of the net of the '*Suttans*.'

"The subject may be thus set forth in due order."

After describing the magnificence of *Ságalá*, and giving an account of both NA'GA SE'NA and MILINDU in a previous existence, the former as a *Samanero*, and the latter as an *Upasampada*, the narrative thus proceeds.

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* Alluding to the existence of an extensive Bauddha library in *Jesalmir*. The rája of this country is, we hear, passionately addicted to turning, and might barter all his books for a good lathe!—ED.

"Thereafter, in whatever manner the appearance of the *3rd*[*] *Maggalliputtatisso* was foreseen by our *Bhagawá*, in the same manner (the appearance of) these two personages also was foreseen by him, for he had thus predicted: 'Five hundred years after my *Parinibbánan* they will be born. Whatever discourse there may be propounded by me, which, from its conciseness may appear entangled and confused, these persons will, from the mode in which they will conduct their interrogation and illustration, thoroughly unravel it. Of these persons, the Samanéro will be born in the character of Milindu rája in *Ságalanagara* in *Jambudipa*, accomplished in learning, skilful in conduct, gifted with judgment, powerful abroad; who, both in the conception and execution of his designs, whether regarding the past, the future or the present, will exert a sound and deliberate judgment. To him many endowments will be attainable, viz: the 'Súte,' 'Sammati,' 'Sankhya,' 'Yóga,' 'Níti,' 'Widésika,' 'Gana ká,' 'Gandamba,' 'Tikechchha,' 'Chatubéda,' 'Purána,' 'Itihása,' 'Joti,' 'Máyá,' 'Hétu,' 'Mantaná,' 'Uddhá,' 'Chhanda,' 'Samuddha.' He will be capable of confuting sages versed in the nineteen védas, invincible from his own gifts, and held in universal estimation, even of those of antagonist creeds. In the whole of *Jambudipa*, there will be no one comparable to Milindu rája, in the aforesaid particulars of power, energy, enterprise, and wisdom. He will be endowed with riches and worldly prosperity; and guarded by military power in a state of the utmost efficiency.'

"On a certain occasion, Milindu rája, desirous of inspecting his military array, composed of every branch of the four constituent hosts of an army, proceeding out of the capital, and having caused them to be counted; this monarch, a profound disputant, and versed in the phraseology and science of those learned in the 'Sakáyata,' looking at (the position of) the sun, thus addressed his attendant officers of state: 'There is a long day before us yet: how shall we pass it? Were I to return instantly to the town, is there any sage, whether sacerdotal or bráhman, the head of a great sect, having a fraternity of his own, and being a preceptor himself, who maintains that he is *arahat* and an omniscient Buddha, who would be willing to enter into a disputation with me, for the purpose of solving doubts.'

"On having thus expressed himself, his five hundred *Yonaká* (chiefs) replied to Milindu rája in these words: Mahárája! there are six (such) viz: †*Puránarkassapo*, *Mokkhaligósálo*, *Nigunto-náthaputto*, *Sanjágo bélatti putto*, *Ajitakésakambuli*, and *Pákudokachcháyano*, who are heads of great sects, having fraternities of their own, and are preceptors themselves, of great celebrity, having numerous congregations, sectarians in principle, the elect of a great portion of the human race. Mahárája! seek them; enter into a controversy (with them) and solve doubts."

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[*] Vide Chapter V. *Mahávanso* for this prediction.

† These are also the designations of certain contemporary disciples of Goutama.

The narrative proceeds to describe the disputation of Milindu, first, with *Purána-kassapo,* and then, with *Makkhaligósálo,* and represents that as the monarch confuted them and similarly overcame every other disputant, all the *arahat* priests absented themselves for twelve years from *Ságalá,* and retired to the vicinity of the *Rakkhitatalo* mountain in the *Himawanta* regions. At the intercession of Assagatta théro, in behalf of the Buddhistical priesthood generally, Sakkha, the supreme of déwas, is represented to have invoked Na'ga Se'na, who was in the *Kétumati* heavens, and called Mahá Se'na, to be born in the human world, for the purpose of confuting Milindu; to which Na'ga Se'na ultimately consented. Accordingly " he is conceived in the womb of the wife of the bráhman named So'nutsara, an inhabitant of the village *Kajangalla* on the borders of the *Himawanta* mountains," and becomes highly accomplished and perfect master of the three *védas.* Doubts are then engendered in his mind as to the correctness of the doctrines contained in those *védas.* While in this frame of mind, Rohana théro, as predestined, enters into a controversy with him, converts him, and removes him to *Rakkhitatala.* There he is admitted into the " *Samanéra*" order of the Buddhistical priesthood, and acquires the *Abhidhammapitaka;* and is ordained an " *Upasampada*" priest at the age of 20 years. He is next placed under the tuition of Assagutta théro, apparently in the same village, for three months, where he first attains the sanctification of " *Sótápatti.*" At the termination of this period, he is sent to place himself under the charge of Dhammarakkhita théro of the *Asókaráma temple** in *Pataliputra,* which is stated to be distant " one hundred yójanas" from *Kajangalla,* the birth-place of Na'ga Se'na. On the road he meets with a *Setthi,* who was travelling also to *Pataliputto,* with a train of five hundred carts. This *Setthi* maintains him on the road, and hears his discourses propounded from the *Abidhamma.* At *Asókaráma vihára,* in the course of three months, he acquires the *Pitakattaya* by heart, and in three more, masters their import, and attains " *Arahat.*" He is then summoned to appear before the *Arahat* priests, who had retired to *Rakkhitatala* mountain in *Himawanta;* and he repairs thither. He is there enjoined by these Arahat priests to proceed to *Ságalá* and cope with Milindu rája, whose triumph over all other théros had driven them to the *Hima-*

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* Vide Ch. V. of the *Maháwanso,* for the construction of this temple, by Dhamma'so'ka.

wanta. He consents to undertake the enterprize, confident of overcoming him, and all other opponents; and advises the rest of the *Arahanta* to precede him thither, without fear. They do so, and *Ságalá* is represented to "glitter with yellow robes again." Milindu then enters into a disputation with Ayupáta théro of *Sankhéya pariwéna*, on the question as to whether the priesthood possess any spiritual advantage over lay ascetics, resulting from their ordination. It does not clearly appear whether Ayupála is one of the priests who came from *Himawanta* or not, but he is also confuted by the rája. The royal suite, composed of the aforesaid five hundred *Yonáká* nobles, do not participate, however, in the monarch's exultation, and attribute the discomfiture of the théro to his individual incapacity. At this particular juncture, Nága Se'na makes his appearance in *Ságalá*, and establishes himself at the *Sankéyapariwéno* with a sacerdotal retinue, which is exaggerated into 80,000. The *Milindapanno* then proceeds to describe the preparation for, and the actual interview between Milindu and Nága Se'na, quoting occasionally from the work before referred to. Milindu, on this occasion, loses his former confidence in himself, both from the fame of Nága Se'na's reputation, which had already reached him, and the composure with which he received him. It is finally agreed upon, that the disputation shall be carried on in the king's palace, in the presence of ten selected théros. The disputations are then entered into accordingly. The *Milindapanno* extant in Ceylon contains 262 dissertations, as well as the designations of the dissertations that are missing, being 42. In the Singhalese version of the *Milindapanno*, from information stated to be derived from a *Tíká* brought from *Siam*, which I have not met with, it is mentioned that these dialectics terminated in Milindu becoming a convert to Buddhism, then a priest, and ultimately an Arahat.

These extracts and abstracts, whether viewed in connection with the events recorded in the Cashmirian history, which also bear testimony to the partial subsidence of the influence of Buddhism in Northern India, and of the congregation of the heads of that faith in the neighbourhood of the Himálayan mountains about the third century B. C., and the subsequent revival of that influence in the days of Nágárjuna and the *Turushka* princes, who are likewise represented to have resorted to *Cashmir* from the same quarter; or whether we regard them in connection with the incidents contained in the history of *Buddhaghóso* in the fifth century of our era, as illustrated in my pamphlet, together with the data contained in Tibetan annals as noticed by Mr. Csomá, are replete with historical importance and engrossing interest. I shall not, however, venture to speculate on data, which are as yet but imperfectly analyzed, and on the authenticity of which oriental scholars have still to form a judgment.

Reverting, therefore, to the consideration of the Cashmirian Chronological Table, I have to observe, that according to the *Milindapanna,* **Ná́ga Se'na** flourished *about* 500 years after the death of **Sákya Sinha,** or B. C. 43. If his visit or mission to *Cashmír* took place towards the close of the reign of the three *Turushka* princes, the rule of their immediate successor, **Abhimanya,** who restored Bráhminism in *Cashmír,* must also have *commenced about* the same date. By your Genealogical Tables, that monarch reigned 35 years, which term deducted from B. C. 43 leaves B. C. 8; being nearly the same date as those to which I arrived, by the two foregoing computations, in which I have attempted to reconcile my adjustment "to the most approved data as yet established in both the Bráhminical and Buddhistical chronologies."

The next and last source of evidence of which I have to avail myself, is derived chiefly from your valuable researches in numismatalogy. At the end of the second volume of Lieutenant **Burnes'** travels into *Bokhára,* some observations are furnished by Professor **Wilson** and yourself, on one of the Bactrian coins found by that enterprizing traveller, and portrayed in the engravings attached to his work*.

The points you seek to establish in regard to this coin are, that it belongs to **Kanishka,** one of the three *Turushka* princes above named; and that he reigned "near the end of the second century B. C." and these points are apparently corroborated by the foregoing date assigned for the age in which **Ná́ga Se'na** lived, viz. about B. C. 43. By your Genealogical Tables these princes are represented to have reigned, synchronously about 60 years: that computation, also, will bring the *commencement* of their rule to B. C. 43 + 60 = 103 B. C. or "near the end of the second century B. C."

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* See the second volume of the Journal, page 314. Most of our readers are aware that the date assigned in our notice of Lieut. **Burnes'** coin, was afterwards in a measure abandoned, on the ground of its being found in association with Sassanian coins of a much later period.—The reading of the letter P in KANHPKOΣ was also confirmed by a multitude of specimens. No argument, therefore, can safely be built on the evidence of this coin as to the period of **Na'ga'rjuna's** mission, but there remains ample authority without it in the written history of the Buddhist church.—The typographical error in Mr. **Wilson's** Chronology of Cashmir I could not fail to perceive when drawing up my own tables; but for the reason above given, I did not think it worth while to notice it.—**Ed.**

I cannot, in this place, forbear noticing that, misled by a slight derangement of type in the impression of the Professor's Chronological Table, you have also in this note been betrayed into making an undeservedly disparaging remark in respect to Buddhistical as compared with Bráhminical chronology. Under the impression that the date assigned in the *Rája Tarangini* to the termination of Abhimanya's reign was B. C. 118, you consider the accuracy of that chronology to be erroneously impugned by being thrown back to B. C. 388, by Professor Wilson, in deference to Buddhistical authority. The date assigned for that reign, however, is not B. C. 118, but B. C. 1182, in the *Rája Tarangini;* and by that adjustment, *made on Buddhistical authority,* though the correction, from the circumstances explained, is insufficient, still an *important and valuable correction is effected to the extent of* 794 *years!*

I have thus, from four sources of information, totally unconnected, arrived at one and the same conclusion, corroborative of the authority of the *Milindapanno,* on which I have added the single letter "*d*" to the numeral "*Sárdhan-satan.*" The chronology of the *Rája Tarangini* is brought, by the first, to coincide with the adjusted Hindu chronology in the *Puránas*—by the second with the *Attakathá* of the *Pittakataya* and the *Mahúwanso*—by the third with the age of Nágárjuna, or Nága Se'na, as given in the *Milindapanno,* and the revised *Sanscrit* quotation from the *Rája Tarangini:* and by the fourth, with the age of the coin of Kanishka; with Tibetan authorities adduced by Mr. Csoma; and with the epoch of the overthrow of the Bactrian dynasty, as given by Schlegel and other authorities.

In computations of this nature, exact precision is not to be attained, or expected. In specifying the age of Nágárjuna, in such round numbers as 500 years after the death of Sákya, it is manifestly an approximating rather than a specific date. If from the general tenor of the *Rája Tarangini,* and the Tibetan authorities referred to by M. Csoma, it be clearly shown that the *Turushka* princes were Buddhists, and that Nágárjuna appeared in *Cashmír* during their dynasty, the only alteration rendered necessary in the foregoing computations, would be that his visit to *Cashmír* should be considered to have taken place about 460 instead of 500 years after the death of Sákya. Mr. Csoma's unpublished life of Sa'kya, to which you refer as containing data connected with Buddhistical history, derived from both *Sanscrit* and *Tibetan* works of the age of Kanishka, furnishes another important and encouraging evidence of authentic annals of Buddhistical history having extended in Continental Asia beyond the age of Aso'ka.

II.—*Third Memoir on the ancient Coins discovered at the site called Beghrám in the Kohistán of Kábul. By* Mr. Charles Masson. *Dated Kábul, May,* 1836.

Two notices on the site of *Beghrám,* and of the nature of the coins found at it, have already been made public in the pages of the *Journal of the Asiatic Society of Bengal.* The collection of its antique treasures having been continued for three successive seasons, the results may be worthy of being presented in one view, both for exhibiting the exact state of discovery up to this time, and for providing data on which to found inferences or to hazard conjectures on the curious and intricate subject of Bactrian history and antiquities.

It is not the object of this memoir to convey a full account of the present state of knowledge on these and other points, upon which, in truth, light is only beginning to dawn ; but simply to narrate the fruits of our own labors, happy if they prove useful to those, who, with superior advantages, and when sufficient materials are collected, will, no doubt, favor the world with some important work. We have, therefore, only to descant upon the coins found at *Beghrám,* and such, allied or connected with them, which may have been procured by ourselves in *Afghánistán,* and refrain in the same spirit from the delineation of any coins not actually found by us ; and if such are alluded to, it is from necessity, and to direct attention to them.

The site of *Beghrám,* whatever its original name may have been, and whoever may have been its founder, yields evidence from the coins found at it, of its existence as a city, which must, at least, have flourished from the epoch of Euthydemus, the king of *Bactria,* to that of the Mahommedan Caliphs—or for a period of 900 years. We have speculated on the probability of its pointing out the situation of *Alexandria ad Caucasum,* or *ad calcem Caucasi,* and see no reason to change the opinion, viz. that the honor of being considered such, must be assigned to it, or to *Niláb* of *Ghorbund.* The detection of a coin of one of the Antiochi, may prove that it flourished prior to the age of Euthydemus, as it undoubtedly will have done,—and certain Hindu Brahminical coins* described as Class Brahminical, may perhaps verify that it existed subsequently to the Mahommedan Caliphs, or to the duration of their sway in *Afghánistán* :—at all events, it would appear to have been destroyed, in whatever manner, before the era, when coins with Persian legends became current in these regions ; as our aggregate collection of nearly 7,000 coins from its site, has not been contaminated with a single Persian coin—unless fig. 9. of the just noted Hindu series have a Persian legend, which may seem to intimate that the city's extinction was about the period of the introduction of the language, which may have been contemporaneous with the rise of the Mahommedan sovereignty of *Ghazni*. The coins of its princes have Persian legends, to prove which, we have inserted a silver coin of the celebrated Sultan Mahmud: none of his coins or of his father, Sabektegin Kha'n, have been found at *Beghrám*, where those of the Caliphs so numerously occur.

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* Of the Rajput, or bull and horseman groupe.—Ed.

Although *Beghrám*, inferring from the presence of topes or sepulchral monuments on its site and in its vicinity, may be supposed at some period to have been a capital, which its name testifies, it will generally have been only a provincial capital—and this is worthy of note, because there may be reason to suspect that many of the former rulers in these countries, particularly the Greek-Bactrian princes, had distinct provincial coinages.—Certain coins of Apollodotus, Antilakides, Ermaios and Eucratides seem to countenance the suspicion.

It is presumed that coins constantly found and in number on any known spot, afford proofs of their having once been current there, and that the princes whom they commemorate, whether as paramount or tributary sovereigns, held also authority at that spot. The numbers in which coins may be found, may perhaps furnish a criterion upon which we may calculate, first generally, the duration of the dynasties denoted by the various types of coins, and next particularly that of the reign of each individual prince. A collection of one year would not furnish this criterion, a collection of many years might,—a statement is therefore annexed, of the numbers in which the several descriptions of coins found at *Beghrám* have, during three years, been obtained;—and if it be seen, that they are found annually in due numerical proportion, it may be of service in our speculations, assisted by the coins themselves. Indeed of the recorded kings of *Bactria*, the coins are found in just the numbers we might expect, and confirm what we know as to the length of their reigns; and in some other instances of unrecorded princes, their coins and the frequency or rarity of their occurrence corroborate the conjectures as to the extent of their reigns, which other accidental discoveries seem to authorize.

The coins of *Beghrám* fortunately admit of ready classification, and may be reduced to five grand classes: 1st, Greek-Bactrian; 2nd, Indo-Scythic or Mithraic; 3rd, Ancient Persian, whether Parthian or Sassanian; 4th, Hindu or Brahminical; 5th, Kufic or Mahommedan—the last class may chronologically be entitled to stand before its predecessor the Brahminical one.

These classes at once point out the general nature of the succession of sovereignty in this country, from the age of EUTHYDEMUS to the Mahommedan era. To define particular alternations and revolutions in authority, which will inevitably have happened, more knowledge is requisite than we possess, or are likely to acquire. Yet some of these may be conjectured from the faint lights discovered coins impart, and many more may become obvious, as research advances, and as we progress in acquaintance with the subject.

From the historical records of the west we learn so much as, that an independent monarchy under Greek princes was established at *Bactra*, or the modern *Balkh*, about 250 years before Christ; and from them we are led to infer that it ceased to exist about 130 years before Christ, having thus flourished about 120 years. From the same records we also learn the names of seven of its princes, THEODOTUS I. the founder, his son and successor THEODOTUS II. the usurper EUTHYDEMUS of *Megnesia*, his son DEMETRIUS, APOLLODOTUS, and MENANDER, famed for exploits in India, and mentioned conjointly with EUCRATIDES, surnamed the Great.

The actual coins, incontestible evidences, recently discovered of a multitude of Greek princes, respecting whom history is silent, not only seem to intimate that the *Bactrian* empire may have had longer duration than supposed, but farther to establish the fact, that a variety of independent Greek principalities were erected about that time in Central Asia, some of which, judging from the coins of the princes, rivalled the *Bactrian* in power and splendor. These principalities, or some of them, we infer to have endured up to the first century of the Christian era,—probably to the middle or close of the second century, about which period Greek authority would appear to have been displaced by the race of princes hitherto designated Indo-Scythic, of whom KADPHISES and KANERKOS are pre-eminent and have the precedence. Their successors appear to have ruled for a very long period, according to circumstances, independent or tributary to paramount governments in Persia or India,—perhaps very close to the Mahommedan era. We say very close, because before the last mentioned era, a Sassanian dynasty or dynasties must be introduced, and possibly may have ruled at that epoch. This speculation may be confirmed or otherwise, by consultation of the Arabian historians, some of whose works will doubtless inform us from whom the armies of the Caliphs wrested these countries. *Beghrám* has not yielded one coin of the Arsacides, or one coin that we dare positively to affirm to be Parthian. Coins with the Sassanian symbols on the reverse, or the distinguishing fire altar, are very numerous; but it may be questioned whether they are coins of the Sassanides of *Persia*, and whether they may not rather refer to distinct princes, that we believe Persian authentic history attests to have flourished in these countries, as at *Zabulistán*, &c.

The characters of the inscriptions on the *Beghrám* coins, some of which command attention from their peculiarity, may be also useful in determining the periods at which particular dialects ceased and became used in *Afghánistán*. The earlier Greek-Bactrian sovereigns, as EUTHYDEMUS, being guided by coins hitherto found, placed on their monies only Greek inscriptions; some of their successors, as EUCRATIDES, have coins bearing in the same manner only Greek legends, and others exhibiting both Greek and native legends; while others, and the majority of them, as APOLLODOTUS, MENANDER, &c. have on their coins invariably both Greek and native legends; no one coin of these sovereigns having been met with bearing simply a Greek inscription. The opinion might be advanced, that native legends were first adopted by those princes who extended their empire by the acquisition of distant provinces, and their absence on the coins of EUTHYDEMUS will not controvert it, as it is nearly certain that he could have carried his arms across the *Causasus* or *Hindu Koosh*, only towards the close of his reign. Another question will then arise, whether the characters of these native legends refer to a language common in *Bactria* or the countries north of *Caucasus*, or prevailing only in the Indian provinces south of it:—the latter may be suggested, by those who suppose MENANDER to have ruled in India before he conquered *Bactria*; for if he did, so did APOLLODOTUS; and on the coins of these princes, these characters will then be first noted. It is not, however, positive that MENANDER preceded EUCRATIDES; for although generally believed, the scant historical data left us are as much against the belief as for it. The language itself, that of this part of Asia, two centuries before Christ, will not have become obsolete until the period or nearly so of the Mahommedan era; for although the coins of KADPHISES, whose epoch we would fain believe was about 200 A. D. are the latest apparently which exhibit them,—excavations near *Jelálábád*, in the burial grounds of the ancient *Nagara*, have elicited inscriptions in the same character, which may safely be assumed to have been deposited at some period within the century preceding the Mahommedan era. Indeed, if the famous *Manikyála* tope be an erection subsequent to this era, as we suspect to be proved by some of the coins extracted from it, the language may have continued in use to a much more recent period; and all these circumstances may be adduced to support the opinion, that it is of Indian rather than of Bactrian origin. Mr. PRINSEP has admirably commenced the investigation of this novel language, and to assist in the attainment of an object, from which so much advantage is likely to be obtained, we have, following that gentleman's plan, given the names, titles and epithets of the Bactrian kings, &c. as we find them on coins before us. This might have been more satifactorily done, had we, for the purpose, taken full advantage of all the coins which have passed through our hands : but as they have been transferred only to receive superior attention, the matter occasions no regret, and is noticed to excuse individual neglect in this instance and in another, viz., the passing slightly the characters on our Sassanian coins, which, while they exhibit some varieties, appear singular and different from the ordinary forms of *Pehlevi.*

The coins of Agathocles and Pantaleon have native legends in another peculiar character, essentially distinct from that found on the coins of the other Bactrian princes, and both of them on every account must stand high in the royal lists of these countries. The character, Mr. Prinsep suggests, is that of the inscriptions found on the columns of *Delhi* and of other places in India,—a character also that of the coins of the early *Canouje* princes, and singular it is that a connection may be traced between these coins and those of Agathocles and Pantaleon.

About the period, or a little anterior thereto, of the Mahommedan invasion, we find the first traces of Nágari, but on coins which we are not positive were current at *Beghrám.* The Caliphs introduced *Kufic,* shewn by their coins, and on the inscriptions of the columns at *Ghazni,* the seat of their government. To them succeeded in authority the Brahminical sovereigns, as we suppose, whose coins have again Nágari legends, and these were expelled by the Mahommedan princes of *Ghazni,* when modern Persian became the general and written language of the country, as it remains to this day.

It may be proper to note, how tenaciously the Greek language was preserved on the coins of this country, up to a period within a century or two of the Mahommedan era, and employed by the whole series of Indo-Scythic kings excepting Kadphises, to the exclusion of the native dialect. While there is sufficient testimony that the Greek language was studied and well known by the fashionable and higher orders in India during the first and second histories of the Christian era, the latter coins of the Indo-Scythic princes seem to testify, by the very corrupted characters they bear, that at the period of their coinage the knowledge of it was very trifling, or limited to the power of determining the value of its letters,—Greek artists would then have been out of the question ; and without some such knowledge it is difficult to conceive how Indian artists could have arranged in Greek characters such words as ΑΘΡΟ, ΜΙΟΡΟ, ΦΑΡΟ, ΟΚΡΟ, &c. The respect so obviously shewn to the Greek language may suggest the opinion, that coinage was considered eminently a Grecian art, and corroborates the notion that the Macedonians introduced it into these parts of Asia.

The several devices of the Bactrian coins, whether Greek or Indo-Scythic, are interesting from their variety, and instructive from the information they convey as to many points, particularly the religion of the times. Of the Greek, some display the deities of the classical Grecian mythology, as Jupiter, Minerva, Apollo, Hercules, &c. represented in the attitudes, costumes, and with the attributes commonly assigned to them in the West;—some have animals, as elephants, horses, bulls, camels, &c., from which may be implied localities of rule; others have warlike devices, as horsemen at charge, seeming to indicate the personal character of the prince, and others appear to commemorate some remarkable incident in his career, as victory presenting a chaplet, or a figure trampling upon a vanquished foe. The Indo-Scythic coins have universally devices, whose accompanying inscriptions, as fully and satisfactorily shewn by Mr. Prinsep, prove to be personifications of the sun and moon. It may excite surprise that the peculiar religion to which such personifications refer, should have been so exemplified on the coins of princes, whom we have considered of the Buddhist faith. It was, nevertheless, the religion of old standing in these countries, the supremacy over which, if acquired by Buddhist or Indo-Scythic princes, will have been acquired, as supremacy ever is, by conquest. Of this ancient religion, besides the evidences furnished by coins, we have that afforded by the temples and places of sepulture. That the Buddhist faith also prevailed, while agreeable to historical record, is not contrary to hypothesis; and the conquerors of that persuasion may, from policy, have placed on their coins the emblems of the national religion of the vanquished. As Buddhism will also have gained ground by a correspondent decline of strength in the religion which preceded it, it is natural that superstitions and observances of both should be blended.

The regions spreading from the source of the Oxus have claims to be considered the birth-place of that peculiar form of the Mithriac religion, which was at one time adopted in all the countries between the Indus and the Bosphorus—and of which vestiges are still seen in the temples and sepultures of its votaries. *Persia* presents the superb proofs of it in the wonderful ruins of *Persepolis*, and *Afghánistán* displays them at *Bamián*. Numerous are the places of minor consideration in *Afghánistán, Turkistán,* and *Badakshán,* which were alike sacred, but in a less degree, which yet plainly indicate the strongholds of the faith they commemorate. The distinguishing feature of these sacred places is the *samach,* or cave, always found with them, and which decides the identity in character of the honey-combed hills of *Bamián* in *Afghánistán,* and those of *Tilmissus* in Asia Minor. It is affirmed in the *Ayin Akberi,* that there are 12,000 of these samaches in the hills of *Afghánistán* :—the number is not overrated. There is no reason to suppose that they were ever the residences of a multifarious community, engaged in the ordinary occupations of life ;—it is obvious, that they were the abodes of priests and ascetics connected with the temples of religion and sepulchral monuments. So plain is this fact in *Afghánistán,* that, if a solitary *samach* or cave be discovered, it is merely necessary to employ the privilege of sight to detect the mound or tumulus relating to it ; and vice versâ, if a tumulus be first descried, the sight directed to the nearest eminence will not fail to discover the cave or caves belonging to it. It is always the case, that these monuments and caves are found at the skirts of hills, shewing that they were remote from the inhabited villages, then as now, and in conformity to the spirit of asceticism, enjoined by the religion of the day. It need not, therefore, be deemed that the caves of *Afghánistán* were the dwellings of a rude Trogloditic nation ;—on the contrary, they are works of art, the results of vast labour and expenditure, and must have been formed under favorable circumstances of national prosperity. Let no one imagine he beholds in them the retreats of the Mardi. The most prominent of the sepulchral monuments of *Afghánistán* are unquestionably its topes or royal cenotaphs with their tumuli : the latter so perfectly agree in form with the Buddhist *dehgopa* that it would be difficult not to allow them to be the same thing. The most ancient of the cenotaphs hitherto examined in *Afghánistán* does not appear to attain the antiquity of the Christian era,—most of them certainly fall much short of it : it is true that every tope has its caves, but there are caves, as in the conspicuous instance of Bamián, which have not topes : Bamián*, like every other spot in *Afghánistán*, has its mounds or ancient burial places. The cave temples may therefore be considered, in some instances, more ancient than the topes, whose age is within the reach of verification; and while it may point to the period of the introduction of Buddhist sovereignty in *Afghánistán*, that of the cave temples must be carried to the period when the religion, in whose service they were constructed, had its rise or was pre-eminent. Of this religion the Guebres are, at this day, evidences, as are possibly the inhabitants of *Cafferistán*. Asceticism, of which every case presents a memento; while a distinguishing feature of primitive Buddhism would be also a condition of the more ancient Mithriac faith; for

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* There is an error in our account of the site of Alexandria ad calcem Caucasi, contained in our memoir of 1834 relative to the river of Bamián, which it is necessary should be noted. We have made that river pass by *Ghorband,* which we supposed it did, contrary to the reports of the natives—they are correct, and the river flowing northerly falls into the stream of *Kundúz.* PTOLEMY, we believe, has an upper and a lower Nilábí, when noting the country about *Alexandria ;* and they can scarcely be other rivers than those of *Ghorband,* and *Púryshír.*—May, 1836.

> "La religion a toujours produit des solitaires."

Reverting from this digression to the coins to which the term Indo-Scythic was once considered so aptly applied, and whose sovereigns we had considered, in deference to historical evidence, to have been of the Buddhist religion, if it should be ultimately found that they were of another faith, yet the Buddhist religion will have been widely disseminated in *Afghánistán*, the images of Buddha and other idols to be found in abundance being accepted as proof. The apparent traces of the faiths of Mithra and Buddha observable in the antiquities of the country, are only natural consequences;—in like manner, at *Moscow* before its destruction, might be seen the mosques of Mahommedans surmounted by the cross, as at the present day at *Constantinople* may be witnessed the temples of Christianity surmounted by the Crescent. The terms applied to designate the sun and moon on these Indo-Scythic or Mithraic coins, may suggest some reflections, some of them appearing to have been derived from the West, as HAIOC, NANAIA, ΦAPO, &c. and others from the east, as MAO, OKPO, &c.

We had hoped to have obtained a sufficient quantity of coins from some known spot north of the Caucasus, which could not fail of throwing additional light on Bactrian numismatology; but not having been able personally to attend to the point, dependence upon others has hitherto frustrated our object. Even at *Beghrám* we have not met with all the coins that probability would lead us to expect; at least we dare not appropriate any of them to the *Pandava* dynasty, which governed in the *Paropamisus* at the period of the invasion of ANTIOCHUS the Great. It is but reasonable to suppose that after the Macedonian invasion, all the native princes had distinct coinages, and, of course, this dynasty among the rest. Greek historians have preserved the name of SOPHAGASENUS, who established himself in the *Paropamisus*; and Sanscrit records, as Colonel TOD informs us, gives the name of his son GAJ, both valuable; Gaj accounting for the etymology of *Gaj-*

ni, or as now called *Ghazni;* and SOPHAGASENUS, shewing the name both of the prince and of his nation. The former, Colonel TOD tells us, was *Subhav* or *Subhag ;* and as for the latter, we learn from PLINY that the ASENI peopled three cities, their capital being *Bucephalia ;* the ruins of this city may still be seen on the Jèlum river, in the Panjáb, and the Yadu or Yidu hills, from which SUBHAV issued on his career of conquest, still preserve their ancient name in *Jid* or *Yid.* This branch of the *Pandava* family being cotemporaneous with EUTHYDEMUS of Bactria, who is supposed to have deprived it of sovereignty in the person of Rája GAJ ; it is evident, that the sway of the two first Bactrian kings, THEODOTUS I. and THEODOTUS II. did not extend south of the Caucasus ;—it also is manifest that EUTHYDEMUS could have established his sway over the *Paropamisus* only towards the close of his reign ; for at the time of the expedition of ANTIOCHUS, SOPHAGASENUS, as the Greeks have it, the father of GAJ, was living. PLINY in mentioning the ASENI, is speaking of the nations which inhabited the modern Panjáb, but it is probable that he gives the information he derived from authors who flourished two or three centuries before him ; and this remark may correctly apply to all he advances upon India. His observations on Bactriana, Marginia, &c. he avows to have collected from DEMONAX ; his testimony is not the less valuable on this account, and this slight notice of the ASENI, leads us to the knowledge, that the kingdoms of PORUS and TAXILES had been subverted or had passed into other hands, that the PANDAVAS had possessed themselves of the hilly regions, west of and contiguous to the *Acesines ;* and that *Bucephalia* had risen into importance, and had become the capital of a dynasty.

We had nearly omitted to refer to the monograms of the *Beghrám* coins. The Greek-Bactrian have chiefly alphabetical ones, which conceal much information, never likely to be ascertained. As the same monograms occur sometimes on the coins of more than one prince, they may be presumed monograms of locality, and may be useful to establish a connection, when other indications are wanting. The Indo-Scythic coins have also monograms, but not alphabetical ones, being apparently emblems of authority and religion.

We refrain in these preliminary observations from many speculations to which the subjects referred to might lead,—because it is possible that future discoveries may tend greatly to clear up the difficulties which attend our present investigations into the antiquities of *Bactria,* and which may induce very different conclusions from those we now arrive at by conjecture. In the memoir of last year we indulged too freely in such speculations, which occasions regret. Nevertheless, in the subsequent analysis, we have ventured to point out the ideas that have suggested themselves upon reviewing each particular species of coin, not that they may be implicitly adopted, but under the hope, that while liable to correction, they may conduce to promote inquiry and elucidation, and this perhaps is all that can be done until our knowledge is more matured*.

Kabul, December 31, 1835.

Note.—After writing these observations, a copper coin of one of the *Arsakian* princes apparently, has been picked up, in which the obverse legend is in the exact corrupted characters of the Greek legend of the Kadphises coin, the basileus and the first letters of basileôn being distinct: while the reverse legend presents the characters we call Bactrian, but not so clear from the coin being worn, as to allow their transcription with any advantage. Of the characters there is no doubt.

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* Mr. Masson confesses in this memoir that he has been too ready on former occasions to draw inferences which subsequent researches have either failed to confirm or have overthrown. The more he avoids such speculations, the more confidence will be placed in his results, because they will be freed from the suspicion of any bias. We could not, however, have ventured to prune his essays without danger of cutting off what was really valuable, or of robbing him perhaps of some happy conjecture which might hereafter prove well founded. On the same grounds we have formerly allowed names to stand on his list, (like *Ausios*, &c.) which were evidently wrong, and which his further search has led him to correct. His present elaborate memoir is hardly free from the same objection, for it is yet too early to generalize: nevertheless we do not like to keep back a line of his introduction, replete as it is with valuable information. The list of coins to which it is a prelude includes the whole of his former collection, with the additional light thrown upon them by other essays published in the Journal. It would be an useless and expensive repetition to republish these drawings at length, especially when we have not the coins themselves to engrave from.

We trust, therefore, the author will excuse our limiting an insertion of figures and descriptions to those that are new in name or in type. At the same time we shall take the opportunity of adding a few coins from M. Court's excellent drawings, as well as, with permission, some of Kera'mat Ali's second dispatch (lately purchased by Dr. Swiney) which have not yet appeared: always keeping in view the arrangement of our engraved plates for a general compilation on Indian Numismatology hereafter. Mr. Masson's coins have, we presume, long since been despatched to the Hon. Court of Directors through Col. Pottinger, and we have little doubt that accurate engravings of the whole will there be made by the new ruling machine. We must not omit to make public, that Col. Pottinger most courteously offered to send them all for our inspection en route to England, but we felt it unfair thus to detain them on their journey, while we had Mr. Masson's ample investigation before us.—Ed.

Enumeration of Coins collected from Beghrám during the years 1833, 1834, and 1835.

	1833.	1834.	1835
Greek Syrio-Bactrian.			
Antiochus	0	0	1
Recorded Greek Bactrian.			
Euthydemus	1	2	3
Apollodotus	19	31	23
Menander	39	56	58
Eucratides	70	92	107
Unrecorded Greek Bactrian.			
Pantaleon	2	2	3
Agathocles	10	19	14
Lysius	6	5	3
Antilakides	8	16	13
Ermaios the Elder	34	31	27
Ermaios the Younger, (?)	10	5	13
Ermaios	1	0	0
Dicaio, (?)	6	14	13
Lion and Elephant coins	20	23	24
Symbol coins	0	0	11
Unadpherros	19	16	20
ΒΑΕΙΛΕVC ΒΑCΙΛΕШΝ CШΤΗΡ ΜΕΓΑC	171	267	257
Analogous coins, fig. 104 to fig. 106	1	1	0
Ditto fig. 107 to fig. 110	8	24	20
Ditto fig. 111	1	1	0
Ermaios of Nysa, and his family	136	179	278
Archelius	0	0	1
Diomedes	0	1	0
Ipalirisus	1	1	1
Antimachus	0	1	1
Adelphortos. (Spalyrius, J. P.)	1	0	1
Azilisus	0	1	0
Azos*	0	0	0
Indo-Scythic or Mithriac.			
Kadphises	37	Numbers not preserved.	62
Kanerkos	24		4
Kanerki family	44		67
Series 3. Obverse, figure seated in native fashion	10		19
Series 4. Couch-lounger, one foot up	56		175
Series 5. Elephant rider	56		73
Series 6. Reverse, bull and priest-okro	254		492
Series 7. Very rude—reverse, female with cornucopia	113		161
Parthian ? and Sassanian.			
As. fig. 1 to fig. 16. As. fig. 44 to fig. 51. Small, head and fire-altar and large, of all types.	161	Do.	278
Kufic and Brahminical	122		171

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* It is a very remarkable circumstance that none of the coins of Azos, which were so numerous in the Ventura collection from the *Panjáb*, should have been met with at *Beghrám*.—Ed.

III.—*New Varieties of Bactrian Coins, engraved as Plate XXXV. from Mr.* Masson's *drawings and other sources.* By James Prinsep, *Sec.*

Instead of pursuing Mr. Masson's recapitulation of all the coins hitherto found by himself at *Beghrám*, we have preferred selecting those only which were new in name or type for illustration; on the present occasion confining ourselves to those bearing Greek inscriptions of the earlier class, and leaving the Mithriac, of which our author produces some highly interesting novelties, for a subsequent plate.

Fig. 1. A silver coin of Archelius, similar in character to the coins of Menander and Apollodotus*.

Obverse. Bust of king; head bound with fillet or diadem, legend ΒΑΣΙΛΕΩΣ (δικα) ΙΟΥ ΝΙΚΗΦΟΡΟΥ ΑΡΧΕΛΙΟΥ.

Reverse. Jupiter tonans, seated, holding sceptre in left hand. Compound monogram: the legend in the Bactro-pehlevi character is 𐨀𐨪𐨑𐨅𐨦𐨁𐨩𐨯 𐨗𐨩𐨢𐨪𐨯 𐨢𐨿𐨪𐨨𐨁𐨐𐨯 𐨨𐨱𐨪𐨗𐨯. The name is faint in the drawing, but is read with confidence by Mr. Masson from the coin itself. It may be read *A'lakiyo* (or *jo*); but, if the second and third letters can be made 𐨐𐨫, the word will represent very tolerably the pronunciation of the Greek name *A'kaliyo.* The equivalent for *Nicephorou* is an old acquaintance, *Ajalado;* but the middle letter is altered in form. The remaining epithet 𐨢𐨿𐨪𐨨𐨁𐨐𐨯 which I have supposed to be represented in the Greek by *dikaiou*, is in fact found standing for this title "the just," in a coin of the Ventura collection figured as No. 9, of Plate XXI. Vol. IV. A more perfect and legible specimen will be noticed below in Mr. Masson's series (fig. 6,) in which the second syllabic letter 𐨨𐨁 *(mi)* decides the identity: but the initial is more like 𐨣, *n*; and the penultimate is 𐨀 instead of 𐨐; but as the vowel 𐨀 *(a)* according to our former observation, never occurs in the middle of a word, it should probably be read 𐨡 *(d)* and we should thus have additional evidence of 𐨐 being the same letter affected with some vowel mark.

Mr. Masson remarks on this coin: "This silver drachma is an unique specimen found at *Beghrám* in 1835. It is evident that king Archelius must stand high in the list, but there is difficulty in locating his empire: if it be extended to *Beghrám*, why do we not meet with his copper coins?"

The same epithet, as Mr. Masson points out, may be observed on one of the Azos group of coins having the horseman obverse (fig. 22

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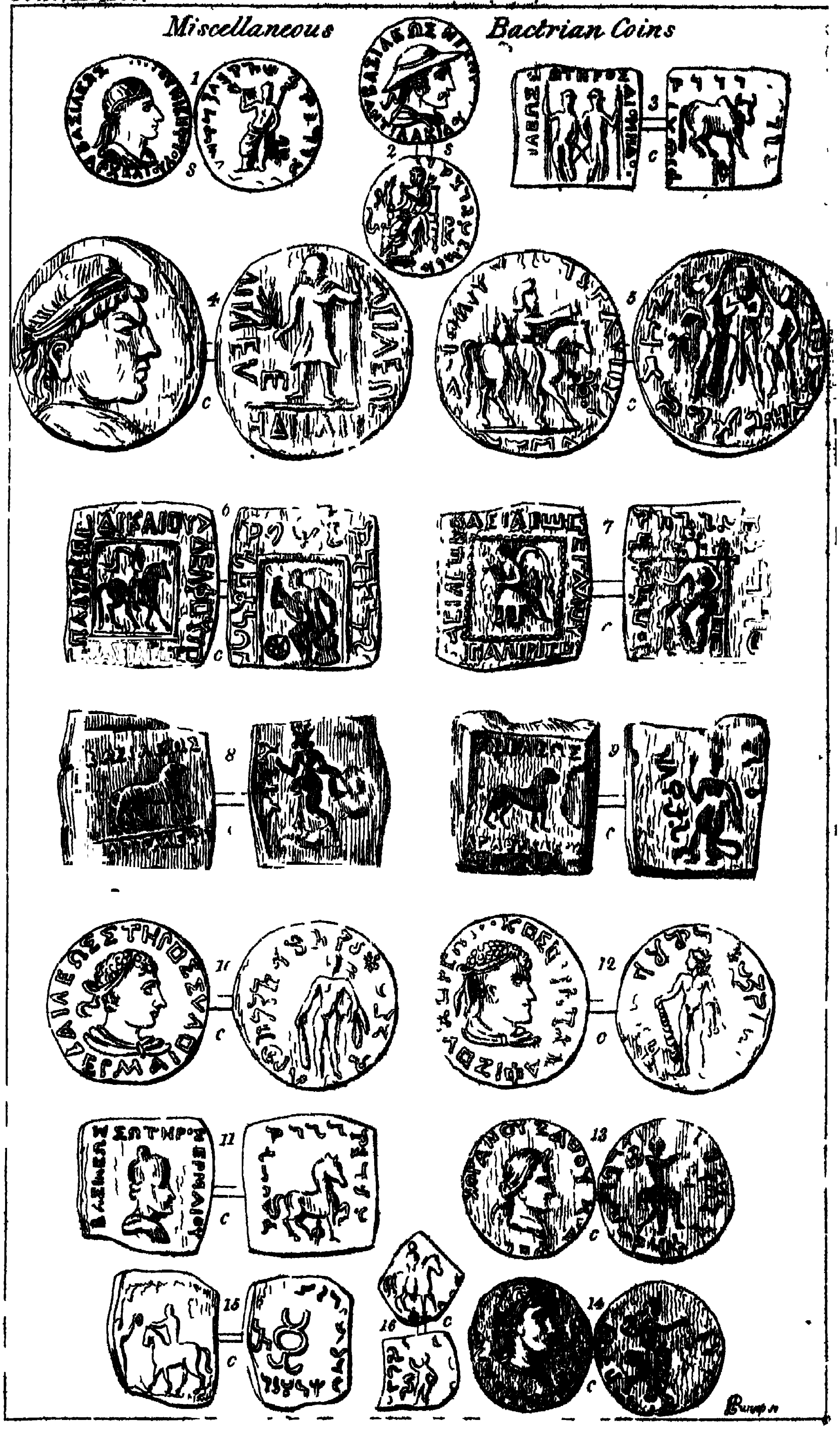
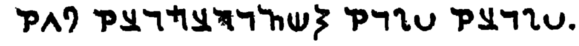
* Col. Stacy writes, while we are correcting this proof, that he has just added another name to this group, ΒΑΣΙΛΕΩΣ ΝΙΚΑΤΟΡΟΣ ΑΜΥΝΤ. . . . but of this we are promised casts in a day or two: it is too late for the present plate.



Miscellaneous Bactrian Coins

of Pl. XXIII. vol. IV.) In our coin the legend was indistinct at the top, but in his drawing it is clearly



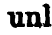
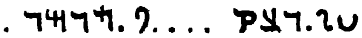
In this the thirteenth letter should probably be , unless by some rule of orthography the epithet "just" is combined by a permutation of its final, and duplicated with the commencing consonant of the following word, which may be recognized without difficulty as the representative of *Megalou*, the great. We are indebted to Mr. Masson for the restoration of the inscription, which we have introduced in this place, because no other opportunity may occur of noticing this Azos coin.

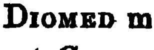
Fig. 2. A silver drachma of Antilakides, discovered by Mr. Masson in 1835.

Obverse. Head of the monarch, with the peculiar hat or helmet common on coins of Eucratides, Philoxenus, Menander, &c. but rather flatter: mustachios on the upper lip (?); legend as in the copper coins of the same prince,

ΒΑΣΙΛΕΩΣ ΝΙΚΗΦΟΡΟΥ ΑΝΤΙΑΛΚΙΔΟΥ.

Reverse. Jupiter seated, holding a small victory in his right hand: in his left a sceptre or trident: monogram compounded of the Greek letters P and K: native legend  as on the copper coins.

Dr. Swiney possesses in the collection lately purchased by him from Keramat Ali, a duplicate of this coin, which shews the completed Pehlevi legend to agree with that given in my former notice. The device on the reverse of the square copper pieces of this prince, two beehives and palm branches, denoting, as Mr. Masson conjectures, plenty and peace, has been met with on a similar coin of Eucratides: in whose neighbourhood, therefore, it is probable the unknown Antilakides should be classed.

Fig. 3. An unique coin of Diomedes, found by Mr. Masson in 1834, and described by him in the present volume, page 24. In the memoir now before us he applies our system to the reading of the native name, which he makes out  *ajamido*, and argues thence that the Sanscrit equivalent for Diomed may be Aja-medha, a prince of the lunar race, who reigned at *Canya-cubja*. "This remark," he writes, "is elicited from an observation in Dr. Mill's historical note on the Allahabad pillar, (July 1834,) that the Chronicles of Marwar represent Nayana Pál as having conquered *Canouje* in the year 470 A. D. from king Aji-pála, a descendant of Aja-medha. We here find a dynasty bearing the common name of *Aja* (identical with the Greek *Azos*), and suspected by Colonel Tod to have been of Scythic origin."

We may remark, however, in opposition to this ingenious conjecture, that the Sanscrit name *Aja* is but a corruption of *Ajaya*, the unconquered, and therefore might more appropriately represent the Greek *aniketos* than *Azos*, which latter I have indeed elsewhere conjectured might be found in the *Yavana-asó* of Hindu tradition*. Moreover, the first letter of the present legend may probably be ב, which would give the reading Pבשʌב *daya-mido*, in exact accordance, as to pronunciation, with the Greek.

Fig. 4 is taken from a drawing by M. Court, who has been fortunate in finding a new type of this curious copper coin, the reverse of which usually presents the figure of a naked horse. (See Vol. IV. page 343.)

The present reverse exhibits the prince holding an olive branch and spear, implying peace or war, in either hand. From the collation of many specimens of the horse variety, and one small one like the above, Mr. Masson makes out the full inscription to be ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΥΣ ΑΠΑΙΥ the Η apparent at the commencement of the lower line being the missing Σ of the word ΒΑΣΙΛΕΥΣ. This reading is confirmed by more than a dozen examples, but it still leaves us with a most unpronounceable appellation. It may possibly be only a perversion of the epithet ΔΙΚΑΙΟΥ. In Masson's small coin the monogram m appears to be the triple blade of a trident reversed, which the figure is holding.

Fig. 5. An unique, is also extracted from M. Court's collection. It assimilates with the numerous class of *Azos* coins, having on the *obverse* a horseman with extended arm. The inscription has much the appearance of Pehlevi, but this may proceed from the indistinctness of the Greek letters. The monogram is very peculiar and curious, from the circumstance of its constant occurrence on the degenerate gold coins of the Kadphises group.

The *reverse* is quite in the Roman taste. Two soldiers seem to be crowning their successful chief, who rests on a kind of club. The name in the legend below is happily most distinct, P7ҡ2ЧΛ; the fourth letter is doubtful, but if read ҡ the combination may be hesitatingly transcribed *Yatilariko.*

Of fig. 6, three examples are known: one in the Ventura collection was depicted in Vol. IV. Pl. XXI. It was copied hastily, and I have now reason to think I must have omitted a letter, having then engraved the name ΑΔΕΛΦΟΡΟΥ. The two new drawings, one by M. Court, the other by Masson, (both agreeing perfectly,) from which the present engraving has been taken, leave no doubt of the correct reading being ΣΠΑΛΥΡΙΟΥ ΔΙΚΑΙΟΥ ΑΔΕΛΦΟΥ ΤΟΥ ΒΑΣΙΛΕΩΣ, 'Spalyrius the just, brother of the king.' The first letter may possibly be an E, or it may be superfluous, and the name be read *Palyrius*, but the Υ on the right hand of the coin is too distinct to permit Mr. Masson's reading of the name ΑΔΕΛΦΟΡΤΟΥ, or my former reading ΒΑΣΙΛΕΩΣ ΝΙΚΑΤΟΡΟΣ ΑΔΕΛΦΟΡΟΥ. It is a very curious circumstance that the prerogative of coining should thus have been delegated to a brother, and we have unfortunately no further means of ascertaining who this indulgent sovereign may have been, further than he probably belonged to the numerous dynasty of Azos and the "great king."

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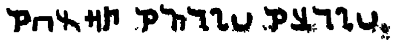
* In the Cashmír list of the *Rájtarangini*, there is a prince named *Asa* (transcribed *Aj* in the Persian of the *Ayin Akberi)* whose date by Wilson is 100 B. C. but when corrected for the epoch of *Asoka*, about A. D. 180. He, too, may be one of our *Asas* family;—but if we go by resemblance of name only, we shall be liable to lay hands on the great Asoka himself as the founder of the line!

On the *reverse* we have either Hercules with his club, or more probably, from the attitude, a musician playing on a kind of guitar. The Pehlevi is very distinct on three sides, and in conformity with the Greek on their parallels, the word for "king" is wanting. It would doubtless have been found in the lower compartment. The remainder, borrowing two first letters from Masson, reads Ƥ∪ᒣψ⊣ϡƤ7ωჳ Ƥᒣᖶᒣι (⊣7). All that can be certainly extracted hence is that Ƥ7ωჳ, as before noticed, is equivalent to ΔΙΚΑΙΟΥ. The name is unintelligible, and the word for brother, *Ulafarmo*, approaches to no fraternal etymon with which we are acquainted, unless the first letter be ᒣ, *d*, with a vowel mark, which would express something like the Greek itself, *delpharmo !*

Fig. 7. Here again our author's labours of 1835 have enabled him to clear up one of our doubtful names (Pl. XXI. fig. 6,) and to correct his own reading of last year, (see page 25,) where he supposed it to be ΠΑΛΗΡΚΟΥ. From the native legend I had supposed the word might be read *Ulidizou*. The real name and title is now made out from six very distinct samples sent to Mr. Masson from *Munderaur* of *Lughmán*, which were in excellent preservation, having still upon them the lime cement which had been used in depositing them in some tomb. It runs thus; ΒΑϹΙΛЄШΝ ΒΑϹΙΛΕШϹ ΜЄΓΑΛ□Υ ΙΠΑΛΙΡΙϹ□Υ, a name which betrays a kind of patronymic affinity to the last mentioned *Spalyrius ;* while in the style of coin there is also a remarkable similarity. The divinity on the *reverse* is, however, a Jupiter in his celestial chair. The native legend is easily brought to agree with the Greek, through the facile mutation of letters of acknowledged similarity ; thus the ϡ *u*, must be a ᖶ, *p :* and the ⊣ *di* must be *ri*, and thus the context will become , *malakdo malakko palirijo*, the epithet *megalou* seems to be omitted.

Figs. 8 and 9. These two coins, made known in Mr. Masson's first memoir, I have now had an opportunity of engraving from specimens in Dr. Swiney's purchased cabinet. The Pantaleon of fig. 8 is quite legible, and the curious and unknown letters of the reverse are distinct, and perfectly accordant with Masson's original drawing. The word ΑΓΑΘΟΚΛΕΟΥΣ however, is only partially visible on fig. 9, and is completed on his authority. In other respects the two coins are identical, having a dog or panther on the obverse, and a clothed female on the reverse, with a flower in the right hand. The similarity of the native character to the alphabet of the Indian láths has been before noticed, as well as the frequent occurrence of the symbols and on coins of this group (see Pl. XXXV. of Vol. IV.)

Fig. 10 is introduced from Masson's plates as a more perfect specimen of the Hercules-reverse type than any in my former Plate (XXIV. of Vol. IV.) as regards at least the Greek legend, which is here evidently ΒΑΙΛЄΩΣ ΣΓΗΡ□Σ ΣV ЄΓΜΑΙ□V. This *Ermæus* differs from his namesake by the reverse, and by the great corruption of the Greek; but it is possible that the piece may have been contemporaneously struck at a provincial mint; and in such case, if cities may be recognized, as among the Greek coins, by their tutelary deities, we shall find a clue to the appearance of Ermæus' name on the following coin, fig. 11, which bears the reverse of the naked horse. It might perhaps be allowable to assign this horse as the armorial symbol of *Bucephalia*, while the Hercules might be attributed to some town conspicuous for his worship: victory to Nicea; and Jupiter to one of the Alexandrias (being the general reverse of the Alexandrine coins.)

The native legend on fig. 11 is the genuine Pehlevi one of Ermæus; but that on figure 10 is of the modified character so puzzling to the decypherer. It passes unaltered through a succession of princes, and may perhaps therefore embrace only their titles.

Fig. 12. It was from dubious authority that I added the name of ΚΑΔΦΙΣΗΣ to this group. Mr. Masson's Researches have now given authentic evidence that I did so justly. He has, this year, fallen upon two coins in which the name is quite distinct. It is remarkable, however, that the title of ΒΑΣΙΛΕΩΣ is here for the first time omitted, and the foreign expression ΧΟΡΑΝΟΥ introduced. This, it will be remembered, is precisely the transition that is traced in the Indo-Scythic or Mithriac series of Kanerkos; and thus we have pretty strong grounds for inferring that the change was simultaneously effected in various provinces of the empire of the foreign, (or domestic,) usurpers who supplanted the dynasty of Bactrian descent.

There is, however, another very curious circumstance to be noted in regard to fig. 12. The Greek legend is Κ□Σ□VΛ□ ΚΑΔΦΙΖ□V Χ□Ρ*ανου*. Now, as good luck will have it, Mr. Neave, of the Civil Service, has just favored me with a few old coins picked up in the mofussil, among which is one in excellent preservation and well executed of the ΚΑΔΑΦΕΣ ... kind described in my former paper (Vol. IV. Pl. XXIV.) The name on this coin (which I have engraved as fig. 14,) is very clearly ΚΟΖΟΛΑ ΚΑΔΑΦ.... which is just such a deviation from the orthography of Masson's coin, ΚΟΣΟΥΛΟ ΚΑΔΦΙΖΟΥ as a provincial dialect, added to the difficulty of expressing native names in a foreign alphabet, would justify and explain. The name on two of the coins of Plate XXIV. Vol. IV. may be also read ΚΟΖΟΛΑ.

Among several coins of the same class in the collections of Capt. Cunningham and Dr. Swiney, as well as in Masson's plates, other variations of the spelling occur, ΚΟΣΣΥΛΟ—ΚΟΖΟVΛΟ, &c. until at last the word becomes utterly illegible.

In a private letter from M. Jacquet, of the Paris Asiatic Society, that gentleman expresses his conviction, after seeing Dr. Martin Honigberger's coin, that the name we have called ΚΑΔΦΙΣΗΣ should be written ΜΟΚΑΔΦΙΣΗΣ, which he supposes equivalent to the Sanscrit *Mahatrishi;* but I think we have abundant evidence against such a conclusion, since we can now produce at least three individuals of the family name of *Kadphises*. Thus—

Fig. 13, copied from a drawing in M. Court's memoir, has the legend ΖΑΘΟΥ ΚΑΔΑΦΕΣ (*ου*) ΧΟΡΑΝΟΥ ; while on the gold coins, we have already adduced numerous instances of ΜΟ, ΟΟΗΜΟ, or ΟΟΚΜΟ, attached to the same. We shall take some future occasion to place all these varieties under review together; meantime the French ships of the season will, it is hoped, enable us to profit by the disquisitions of the learned of Paris, on this highly interesting question.

Figs. 15, 16. Small coins found by Mr. Masson in 1835, at *Beghrám*. The execution is neat and evidently Bactrian, but the names are defaced. The caduceus of fig. 15 is to be met with on the coins of Menander, and particularly on those of Mayos.

It must not be supposed that Mr. Masson's labours during the past year have been productive of no other novel results than those above mentioned. He has brought to light many new types of the Mithriac series, which I shall reserve for a future plate; besides a very numerous series of what he has correctly designated *Indo-Sassanian* coins, to which hitherto we have paid too little attention. To make their study useful would involve the necessity of reviewing carefully the well known Sassanian coins of Persia proper; a task, unfortunately rendered almost hopeless by the great indistinctness and perplexity of the Sassanian alphabet. I must not, however, on this account, keep back the new and curious coins with Nágari characters of which the *Beghrám* collection boasts.

In conclusion, I must once more offer the tribute of admiration for the indefatigable and successful exertions of the collector of these Bactrian relics, and express a hope that his extensive collection, now consisting of upwards of 7000 coins, may be deposited in our national museum by the East India Company, to whom it is presumed they have been annually consigned.

IV.—*Facsimiles of Ancient Inscriptions, lithographed by* Jas. Prinsep, *Secy. &c. &c.*

[Continued from page 486.]

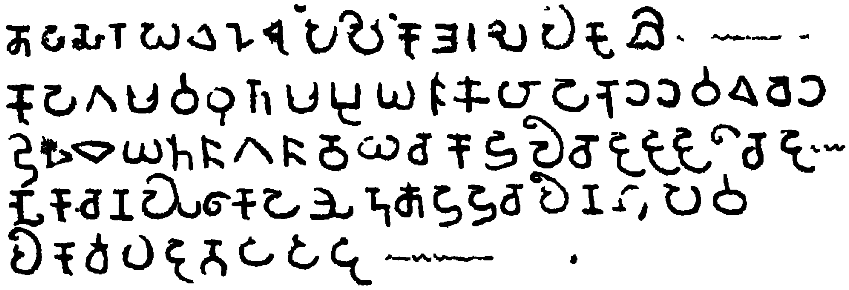
Inscriptions from Trincomalee, in Ceylon.

Dr. W. Bland, of H.M. ship *Wolf,* to whom I am indebted for copies of the three fragments forming figs. 1, 2, 3 of Plate XXVI., has favored me with the following note of their discovery and present situation:

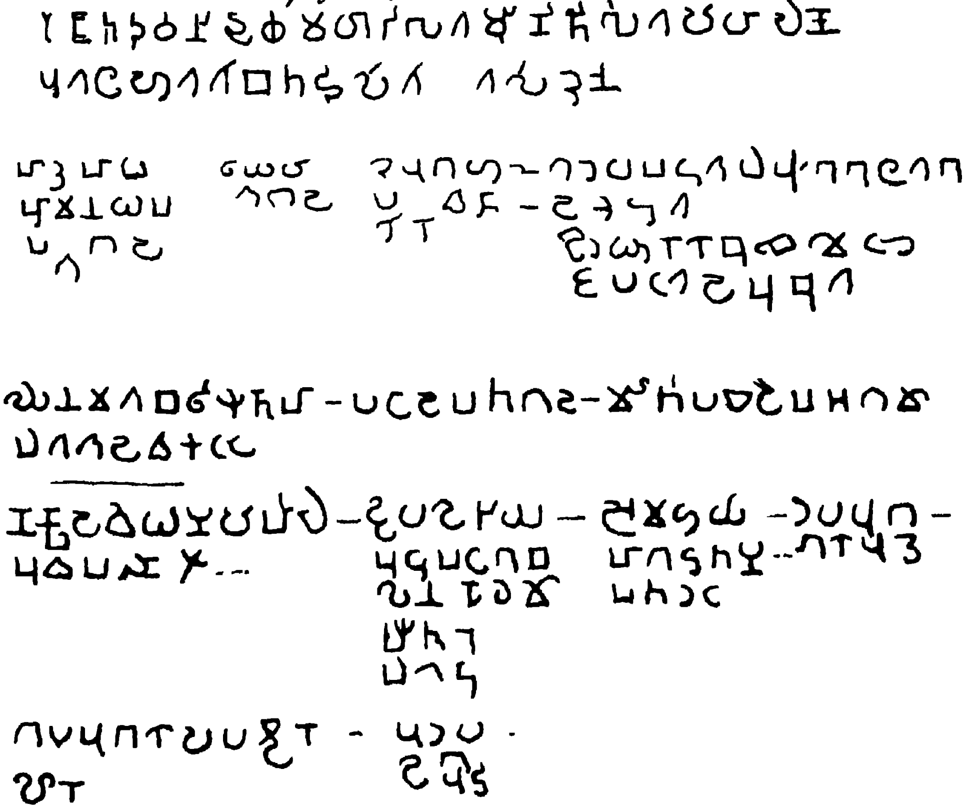
"The three inscriptions are at present in Fort Ostenburgh, which stands on a high rocky tongue of land, forming the south side of the entrance to Trincomalee harbour; these three separate stones have been laid down to form part of the platforms for the guns of the fort. Anciently on the site of this fort stood a venerable temple of the Buddhists, which was destroyed by the Portuguese, and its remains used in the construction of a place of defence. No. 1 is 16½ inches long and 11 inches broad, the letters 1½ inch long, with a groove between each line two inches apart. No. 2, the same size, and its composition the same, and although found in a different bastion, has all the appearance of having at one time been united. No. 3, 14 inches long, and 12 broad, letters one inch long, all distinctly cut in the stone, but appears to have been formerly much larger. Great care has been taken to give an exact facsimile of the inscriptions. The slightly marked letters near the end were more worn, and made so in copying. As this may meet the eye of some one conversant with ancient Sanscrit or its cognate dialects, you will oblige those interested on such matters by publishing these inscriptions."

Inscriptions from Ceylon, continued

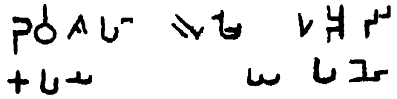
6. SIGIRI



7 from DAMBOOL

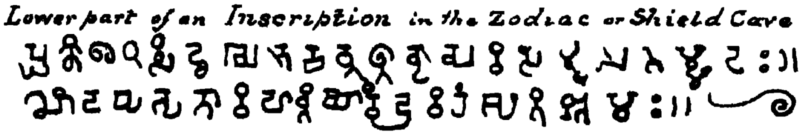


8 from ALUE VIHARI.

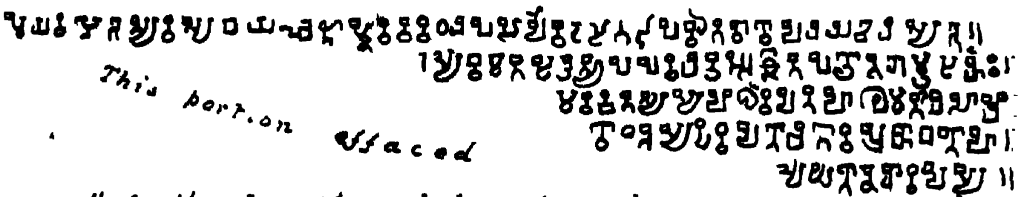


Forbes del

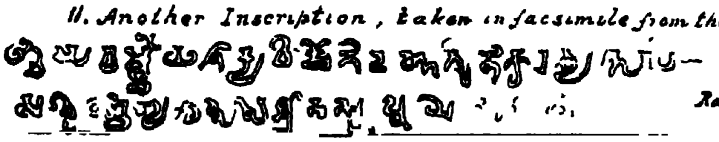
9 Lower part of an Inscription in the Zodiac or Shield Cave at Ajunta



10 Another from the same Cave (supposed to be more modern,)


This portion Effaced

11. Another Inscription, taken in facsimile from the stone



Ralph & Gresley del   J. Basire

The origin of the fragments of inscriptions found at Trincomalee is similarly explained in Sir A. Johnston's note upon a much longer and more perfect inscription from the same place, published in the first volume of the Roy. As. Soc. Trans. page 537.

The whole of the ancient pagodas or temples of Trincomalee were destroyed as above remarked by the Portuguese in the 16th century, and their materials were used in the construction of the modern fortifications. The late Chief Justice of Ceylon adds :—

"The race of people who at present inhabit the province are completely ignorant of the character in which the inscription is written : they, however, believe from the traditions preserved among them, that it is the character which was in use throughout the whole of the northern and eastern parts of the island in the age of the two kings of *Solamandelam*, Manumethy Candesolam, and his son Kalocata Maharasa, who are stated, upon what authority I cannot ascertain, in all the ancient histories of Trincomalee (of which I have in my possession both the Tamul originals and the English translations) to have reigned over the southern peninsula of India and the greater part of the island of Ceylon about the 512th year of the *Kaliyug*, or 4400 years ago*, and during his reign to have constructed not only these magnificent temples, but also the equally celebrated tanks or artificial lakes called *Kattucarré, Padvilcolam, Minerie*, and *Kandellé*, the remains of which may be considered as some of the most venerable and splendid monuments ever discovered."

There are three traditions respecting the contents of the long inscription. 1, that it contains an account of the taxes which the priests of the temples of Trincomalee had a right to levy, and of the expences incurred in the buildings : 2, that it contains an account of the construction of the great tank : and 3, that it contains the heads of the civil and criminal laws of the country.

However this may be, it is not likely that we shall very speedily be able to benefit by the preservation of this curious document, unless an actual facsimile be substituted for the manual copy published in the Transactions. It is evident from the form of many of the letters in that, and in Dr. Bland's fragments Nos. 2 and 3, which have a strong resemblance to it in the lines drawn between each row of letters, that these are in a form of Nágari not very different from that of our early *láth* inscriptions, and there is little doubt that an accurate transcript would prove legible. Dr. Bland's No. 1 is apparently much more modern—it is so like Tamul in many letters that I think a Madras pandit would find little difficulty in decyphering it.

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* The names above given are doubtless Tiramadi Canda Sholan and Caricala of the Sholan dynasty of Karnáta, of Buchanan. According to Turnour, the Sholan conquest of Ceylon took place in the year 104 B. C.—Ed.

Other inscriptions from Ceylon, Pl. XXVI. XXVIII.

The preceding note has called to my recollection a number of other fragments of inscriptions in nearly the same character which were sent to the Society in 1833* by His Excellency Sir R. W. HORTON. They were collected from various spots in the *Matele* district by Captain FORBES, as marked on the accompanying plate: and, His Excellency says, thousands of the same nature exist on the island.

The inscription from *Haburenni* offers the best chance to the decypherer from its very perfect state:—In the 4th line I read with ease the words *paramara Mahárája....Srí mad....Vijaya Patísara puta deva.* The same word □ɛɯ *vijaya* occurs very frequently in the course of the inscription. It is a name of great celebrity in the Ceylonese history, as the founder of the earliest dynasty. The opening letters of the inscription are precisely such as appear on our first Canouj coins:—they run *Mujènagama*...

I am not aware whether the inscriptions so successfully decyphered by Mr. ARMOUR, and published in the Ceylon Almanac, include any of this class—but I presume not, as they generally refer to periods much more recent, as the reign of SAHASA MALLA, in the 12th century, when we know by the coins discovered at *Dambedinia,* that the Nágari hardly differed from the present form. Moreover, they are stated to be in the Cingalese language.

Inscriptions from the Caves of Ajanta, Pl. XXVIII.

When I inserted in a former Plate (IX. see page 348) the rude facsimile of an inscription taken for me by Messrs. RALPH and GRESLEY, I forgot that I had in my possession several of a similar nature collected by the same parties during a visit to these caves some years ago, which were in vain shewn to the pandits of Benares and to the Secretary of the College there.

Not being aware that the measurements and drawings made by Dr. BIRD for Sir JOHN MALCOLM have ever seen the light, while the brief notice and rude sketch published by Lieutenant ALEXANDER in the second volume of the Roy. As. Soc. Trans is any thing but satisfactory, I think it but tardy justice to put on record the materials so kindly communicated to myself.

One inscription (fig. 11,) was taken with red paint on cloth from the base of a large statue of BUDDHA, and, curious enough, we here again trace the three initial letters "*ye dharma*" of the Buddhist formula; but

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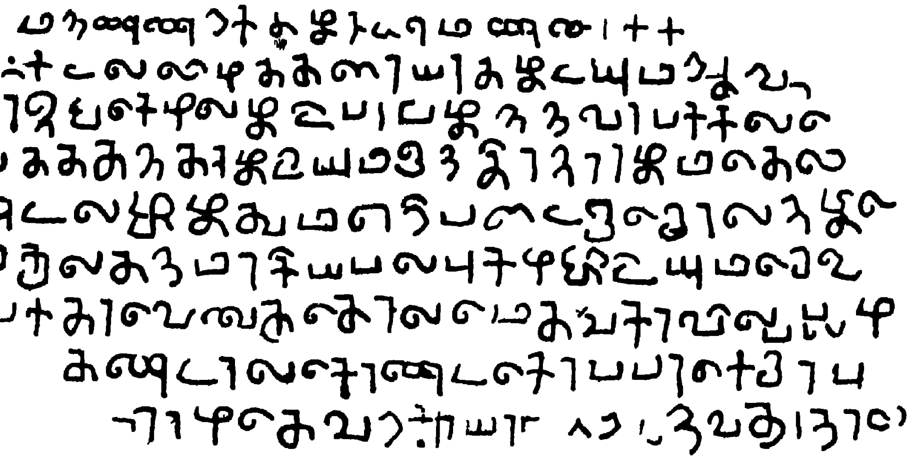
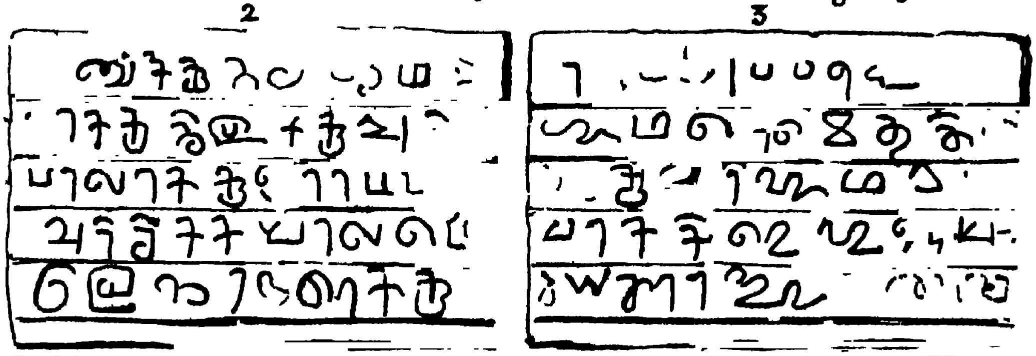
* See Proceedings As. Soc. 30th Oct. 1833.

INSCRIPTIONS at Fort Ostenburgh, Ceylon.

1, on a stone slab. 14 inches by 12. letters 1 in. long.



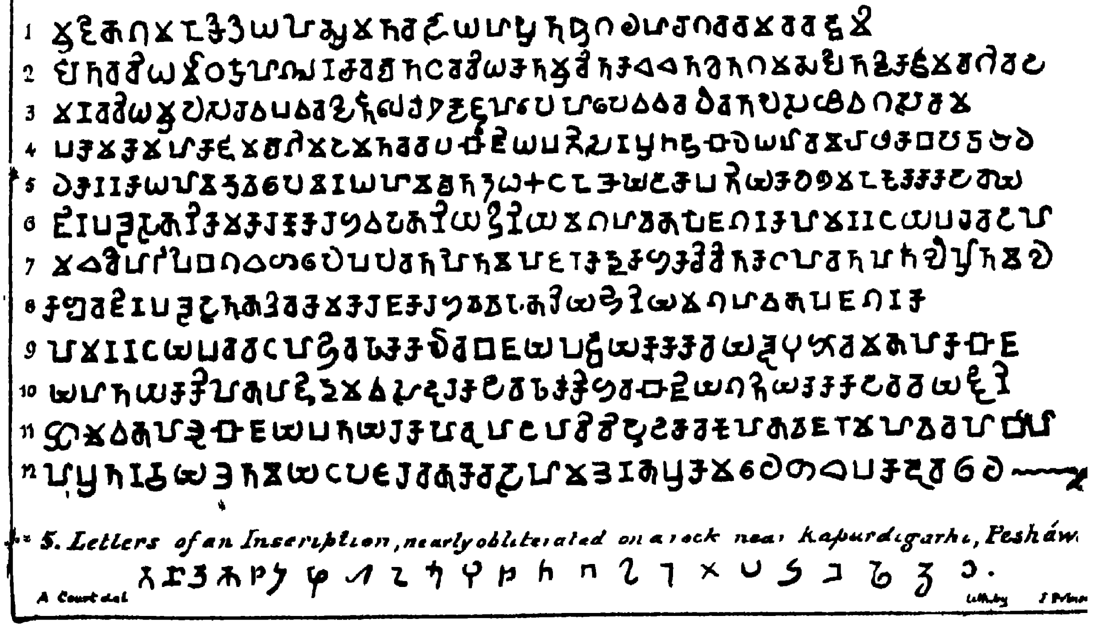
TWO SLABS of Breccia 16 by 11 inches, at Fort Ostenburgh, Ceylon.



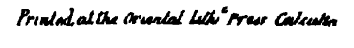
Dr W Bland del

J Prinsep lith

4 INSCRIPTION at HABURENNI



5. Letters of an Inscription, nearly obliterated on a rock near Kapurdigarhi, Peshaw



A Court del

Lith. by J Prin

Printed at the Oriental Lithc Press Calcutta

the remainder is unintelligible, although the value of many individual letters can be readily assigned.

The fragment (fig. 10) in the parallelogram-headed character, (of which an alphabet will be furnished under a subsequent heading,) is all that remains of what was once a long inscription in the zodiac cave. It is therefore useless to transcribe it in modern character, which might easily be done for the major part of the fragment.

But it will enliven the dry recapitulation of such particulars to introduce the reader to the romantic scene whence these antique relics were derived, in the very language of Mr. Ralph's most animated and scenic correspondence—written as he clambered up the precipitous and crumbling entrance, and threaded his way through the recesses of the hollowed hill by the light of the brahman's torch.

"On the 6th of the month I left *Aurungabad*, and went seven marches eastward that I might join Captain Gresley, and induce him to come hither with me. When I found him on the 13th, we were near 50 miles from this place, to which we came in two breakneck marches, galloping over stony roads and rocky torrents at the rate of ten miles an hour. We then rested one day, and on the 18th arrived here at 9 A. M. During the two last days Gresley has been with me, and his exclamations of admiration and regret, the mere variations of wonder,—would fill three pages. The paintings, which are fast fading and falling away, demand consideration. There is nothing in India like them. They give us glimpses of a former world—but, alas! how industriously these valuable and beautiful remains have been by violence destroyed! I shall now rapidly throw together my companion's observations, among which are all mine, in which he agreed. You know I have *no* knowledge of painting or design—only a perception of what is beautiful; but you must have remarked *his* skill in drawing and good taste in every thing.

"These caves are becoming daily more difficult of access. You pass along narrow goat paths with a chasm of 50 or 80 feet below, the footing not nine inches broad, with scarce any thing to cling to. The rains yearly making the passages worse. G. and I admired the fires on the hill above us: grass and leaves burning all night. What followed? Why, last night every hour and oftener, stones and burning rubbish, large logs half consumed, rolled down close to the tent, and this morning the ascent proved more difficult. One cave *is* inaccessible, and several are approached at the risk of life.

'What a wonderful people these must have been! Remark the head dresses. Now, is this a wig or curly hair? *All* the statues, the curved figures of Buddha have them. How can I say? First wigs were made to represent hair, and then hair dressed to look like wigs. 'Tis the shape of your Welsh wig, and rows of curls all over. Then the head dresses and ornaments are different from every thing we now see. These are chiefly domestic scenes—seraglio scenes;—here are females and males every where, then processions and portraits of princes, which are always larger than the rest. The subjects are closely intermixed;—a medallion is twelve or fifteen inches in height; below and above, closely touching, are other subjects. I have seen nothing monstrous. No, certainly, there is nothing monstrous except where we see some figure evidently designed for ornament, as in the compartments of the ceiling. The ceiling—aye, every thing but the floor and larger statues and small figures—every thing has been painted. It is done while the plaister is wet—it is fresco painting. I have seen the operation while going about in Rome. It has been dug off, scraped and knocked off with iron instruments. See how the stone itself has been broken !

Now, Ralph, look here : can you see this figure ? No. Bring the torch nearer. Give me the torch. You can see it better now—hardly ! Let us light dry grass. Bring grass now : place it here. Now watch while the light is strongest : you may now see the whole figure. This is a prince or some chief. It is a portrait. Observe how well fore-shortened that limb is—yes, I can see it now ; but throw water on it—now the colours are more vivid. Here is a lovely face—a Madonna face. What eyes ! She looks towards the man. Observe, these are all Hindu faces—nothing foreign. All the *sweet* countenances are of one complexion. R., now remark. Here are evidently three beauties in this apartment—one an African, one copper-coloured, one of a *European* complexion. Yes ; and how frequently we see these intermixed. See this, R. is a fair man—yes, I think he is a eunuch. Another :—he has his hand round her waist, and she one hand on his shoulder. Observe ; many love scenes, but little gross or grossly indecent : no nudities—nothing like the shocking sculptures on the outside of the temples in Telingana. This must be the inside of a *mahal.* Here is a woman on a *chárpáe* or some stage with legs : See, they are bathing her : do you observe the *ghara* of water in the woman's hand above ? How well executed that figure is ; the fore-shortening of the arms ; the waist—are not her haunches too full ? No. Go farther off, and you will see the figure in a better light : it is correct. This beauty has delicate drapery—nearly falling to the knee : it is transparent, like sky-coloured gauze. Observe that Abyssinian black prince seated on a bed ;—remark his ornaments. Now the woman seated on his left knee whom he embraces is as fair as you or I. Did these fellows get Georgian slaves ? He has two boys or pages to fan him. I wish I could make out this story—there certainly is a story. Here is a fair man of full age, dressed in a robe and a cap like some monk or abbot. Here is next to him a half naked brahman copper-coloured, with shaven crown and the single lock on his head. Here is a man presenting him with a scroll on which *something is written.* He is in a crowded court—he has come to an audience. What can all this be ? This is a procession :—the elephants are passing under the windows, and women are looking out. I think they evidently express alarm. That one has her hand up, as making some exclamation.

How often we see people of three complexions in the same pannel ! Now this is the most extraordinary thing we have found. Here are three placid portraits —they are *Chinese.* Nothing can be plainer :—observe the style of the hair ;—the women have locks brought down in ringlets over the ears falling on to the neck, like some of the Hampton Court beauties. Observe the head dresses : there is something like a bandeau—yes, a muslin band, or the *imitation* of a turban by English women. The cap worn by the chiefs or nobles or princes is a tiara loaded with pearls mostly conical. Round the waist is a cloth, but it is not so full as a *dhoti.* A sort of *jhangla* worn by the women, coming nearly to the knees, and this drapery often transparent. Are these paintings as well done as Europeans could have executed ? In the expression of the *countenances* certainly they are. The perspective is not good, and the pieces are crowded :—yet here is a *small building,* the perspective of which is *quite* correct.

Small buildings, such as are open to a garden with light pillars, are the principal domestic scenes: few or no trees. In two pieces are parties in a boat—the prow and stern both very high. Here is a hunt;—here is a horseman and dogs. I do not like the horses we see—rather poor. These are elephant-fighting;—that head is sublime.

Now, R. remark this saddle;—here is a led horse, and the saddle exactly such as we see in England with a cloth below it—nothing larger—and the bridle too. This is a war scene—here are many spears.

This zodiac, as they call it, is very elaborate. Why they call it zodiac I know not. There is in one part a bull, and in another scales. We must get a ladder to see it clearly. It might have been called the shield of Achilles as well as a zodiac. There have been eight grand compartments and sixteen smaller ones—how full of little figures! I think this is the best example in the whole series, and evidently done by the same *painters* who worked in what we call '*par excellence*' the painted caves. These medallions in the roof are very handsome. I think they resemble compartments in a Turkey carpet, or what we see in a kaleidescope—wreaths and coloured radiated patterns. Here are five women with their feet all towards the centre of the circle:—their heads alone perfect. Are they angels? There are no winged and no two-headed figures anywhere.

The zodiac is incomplete. I think about a third of it is wanting, and the lower part of the circle could never have been complete, for it must have been over this door of the cell. G. Perhaps they covered the top of the doorway with something in order to complete the circle. R. You admire it so much: you are willing to suppose it must have been complete.

What a lovely female! Yes, the last one we discover seems always the sweetest. Here is another heavenly face. This man is her lover:—a handsome fellow. You have his profile looking to the left. How eager—how full of ardent desire! The woman has just turned her face towards him, and looks with timid satisfaction and self-approving coquetry. It is excellent. But here is another beauty:—she is entreating: her head is turned towards some one, above. Is she supplicating or in prayer? Shame to the villains who have destroyed these paintings!

These must have been convents, and these decorations to attract the multitude at festivals and to bring pilgrims from afar. This cave was never half finished. I can fancy that the site of a cave was granted to a society of monks with lands for their support. These, according to their ability, made it large or small, filled it with paintings when able to incur the expense.—The fewer theories you form, the fewer blunders and dreams you will make.

R. We *must* form theories—we cannot remain awake and not do so.

G. Some nation of conquerors who landed at Elephanta, coming from Egypt, first began there, and then got 2 or 300 miles to the eastward. There is nothing like these in Telingana or to the south.

R. No—only some very small caves with sculpture, rude and old,—the cave being as big as one of these ten cells. But the fewer theories you make, &c.

Now, Ralph, look at this! Why, you are half dead—no, not half dead, but knocked up. When you have 25 years added to your present age, and have completed 30 years in India, will *you* labour so well or have so much zeal? 'Tis five to one against my being alive.—But do get up and come hither. This man is going to ravish this woman;—he has a *sword*, too, in his hand. Here are other armed men. Is it the sacking of a city? See how the water brings out the colours,—but I have given Prinsep more than two hours. Have they brought the oil? and the ladder,—they are all here.

21*st.*—A Dr. Bird from *Sattarah*, the Residency Surgeon, come with a design to draw up some account of the caves, dismounts from his horse at 8 A. M. Mutual greetings. In three minutes my new acquaintance praises Mr. Erskine of Bombay; quotes him and *swears by him*, and tells me, 'These are Jain cave temples, and, like most others in this part of India, are dug in basalt. This is amygdaloid basalt: you see it incloses masses of quartz.'

Dr. B. says he has brought a learned pandit to examine the inscriptions; that he is about to draw up an account for the London Asiatic Society, and *carry away* some of the paintings by taking from the wall. Can you draw, Sir? 'No—I am sorry I cannot.' Those who come here with that qualification are disheartened by the difficulty, or have other occupations which demand their attention, (as G.)—As for carrying away the paintings, you can do so *in powder*. I have ascertained that they will not quit the walls in laminæ, but crumble under the touch.

'I am sorry for that. I think a native painter might succeed in copying them.' Certainly he might—but you must attend on your native painter, to give him confidence. This is a wild secluded spot, within a mile or two of the frontier; barren rocks and chains of hills E. and W. The nearest inhabited place is a poor hamlet three miles off. We find marks of recent fires in the caves and caverns, and know that small parties of migratory predatory Bheels who *lift* in these parts, haunt the caves, which are very seldom visited*.

Dr. Bird's so-called pandit proves to be a Marhatta brahman:—can make nothing of the inscriptions—supposes them written by the Jains.

G. For my part, I think it is the character I have seen on the pillar at Allahabad, and on the column at Delhi, which no one can decypher. On the left of the portico to the zodiac cave has been an inscription four feet high and one and a half broad—the left and lower part utterly effaced by the weather. What remains, may afford a few whole words to one who has the key; (see Plate XXVIII. No. 10). Under the foot of a colossal statue, there is part of an inscription, perhaps half a name:—outside another cave. In the zodiac there is some writing—and in the same cave one figure holds out a scroll on which the writing may be legible.

Mallet's figures in the Asiatic Researches would lead a stranger to expect statues—but the figures are entirely in *alto relievo*. Almost the only novelty is the thing I call an altar: it is nine feet high. There are four altar caves, or, as folks call them, *carpenter's*† caves. The first has the figure just mentioned at the back. In the second the altar differs in having an intermediate circle or section of a cone—another globular mass.

[* Capt. Ovans visited in March 1827; Mr. Laing saw two in July; Capt. O., Mr. G. Giberne and Gresley were here in February 1828; Mr. and Mrs. R. on the 8th of that month; G. and R. 18th and 19th of the current month; and, lastly, Dr. Bird, an intelligent young Medical man from Bombay. Lieut. Alexander of the Lancers visited them in 1824.]

† From the tradition regarding Visvakarma's having constructed them in a night. See Sir William Mallet's description of Ellora, As. Res. VI., 389.

In the third small cave, 45 or 50 feet by 20 to 24, is a more elaborate altar *(dehgopa)*, having three globes superposed, and each stage ornamented with four pillars—on the top four figures, now much worn, supported a canopy, (evidently the ordinary Buddhist Chaitya.) But all these desultory descriptions and fragments of conversation can be of no use but to stimulate you to come hither, &c. &c."

In the same graphic style our visitor describes the kund or reservoir at the foot of cliffs 250 feet in height—and the Dehgopa or Buddha cave. Dr. Bird found no less than 25 chambers, some in an unfinished state and now covered with earth. Notwithstanding protestations about defacing monuments, this visitor contrived to peel off four painted figures from the zodiac or shield! To have copied the whole, even had he been an artist, would have taken twenty days. Of the fresco figures, in three divisions of the shield, were extant in 1828, 73 figures varying from 5 to 7 inches high. It is a great pity that none of our European tourists, whose pencils every year produce such exquisite bijoux, can be persuaded to make a visit to *Ajanta,* before the remainder of these treasures of antiquity moulder away with the damp, or fall a prey to the hand of the spoiler.

V.—*Sketch of the State of Múar, Malay Peninsula. By* T. J. Newbold, *Lieut., A. D. C. to Brigadier General* Wilson, *C. B.*

The information contained in this paper was obtained partly from personal observation, and partly from inquiries made while on a visit to the chief of the country at *Gressik,* on the *Múar* river, in 1835.

The state of *Múar* lies to the south of the Malacca territory, from which it is divided, towards the coast, by the *Cossang* river, and interiorly by a suppositious line drawn between *Bankon, Chondong* and Mount Ophir. The *Serting* river separates it from *Pahang,—Parrit Síput* from the tract of *Dattu Káya Padang*—and the *Murbówe Sa-ratús* from *Johóle.*

Population.—The interior of *Múar* is generally termed *Segámet.* The united population is stated not to exceed 2,400. This appears extremely scant compared with the extent of territory; and arises from the misgovernment and apathy of the feudal sovereign, the Sultan of *Johóre*—whence perpetual broils among the petty chiefs, causing insecurity of person and property, and eventually desertion of the soil by most of the cultivating and trading classes of the community. The honest peasant, in many instances, is compelled from sheer necessity to turn robber; and the coasts, instead of being crowded with fishermen, swarm with pirates. These remarks may be applied generally to the whole of the peninsula under native sway, though to *Múar* more particularly; the whole of which country appears to be one almost uninterrupted mass of jungle and swamp, if we can except a few straggling villages and clearings. Cultivated rice grounds have degenerated into barren marshes—an enormous forest, abounding with wild elephants, overshadows a soil naturally rich and prolific; while the gaunt rhinoceros and uncouth tapir stalk unmolested over spots which, if tradition belies them not, were once the sites of large and populous towns.

Such is the melancholy picture of the effects of misrule which this unhappy country presents to the eye of the traveller, who cannot avoid being sensibly touched by this forcible, though silent, appeal for melioration.

The principal villages are *Bokko, Langkat, Gressik, Ring, Segámet, Pagoh* and *Pangkálang Kóta,* the residence of the chief, on the river,

Produce and Revenue.—The produce of the country consists of a little rice, sago, ivory, ebony, gold dust, tin, wax, aloe-wood, gum benzoin, camphor (small in quantity and of inferior quality), ratans of the kinds *Battu* and *Jagga, Dammer Battu, Dammer Miniak,* jaggery, *Lakko* wood, and *Gulígas,* stones extracted generally from the heads of porcupines, and in much repute among Malays for medicinal purposes.

The chief has been empowered by the late Sultan of *Johóre* to levy an impost upon every *bhar* of tin exported, of 1½ Spanish dollars.

One hundred bundles of ratans,	1	do.	do.
One bhar of ebony,	1½	do.	do.
One koyan rice imported,	2	do.	do.
One koyan salt ditto,	1	do.	do.
One katti of opium ditto,	20	do.	do.

On smaller articles he levies a duty of 5 per cent. He has the power of exacting the gratuitous labour of his subjects, and derives some emolument from the fines he inflicts on them at pleasure.

Government.—*Múar* is under the sway of a chief bearing the title of *Tumúngong,* who is a vassal of *Johóre.* Under the *Tamúngong* are eight *Panghúlús,* four of whom are styled *Ampat de Ilir*—the remainder, *Ampat de Ulu.* The former are the *Panghúlús* of *Gressik, Bukit, Ráya, Liang Battu,* and *Ring*;—the latter, those entitled *Besar, Tanjong, Daggang,* and *Muncal.* There is nominally a mosque under each *Panghúlú,* but in that of *Umbum* alone is the *Juma-ahad* held. This is in the jurisdiction of the *Panghúlú besar.* The customs enjoined by the code termed *Undang Undang Maláyu*; and the Mahommedan law of succession obtains, to the exclusion of the *Trómba Pusáka* prevailing in the four *Menangkábówe* states.

History.—*Múar,* like the rest of the Malay peninsula, was formerly inhabited by savage aboriginal tribes, among whom the *Jacoons* seem to claim the superiority. With regard to its origin, it is stated in the *Sejára Malâyu* that *Sri Iscander Shah,* the monarch of *Singhapúra,* on his city being taken by the *Bitára* of *Majapahit,* fled to *Múar.* This event took place about the middle of the 13th century; and it is asserted that he left one of his *Mantris* in the interior of *Múar.*

No more mention is made of this state until near the middle of the 14th century, when the kingdom of the Sultan of *Malacca,* Mozaffer Shah, was invaded by the Siamese under T'hawi Chacri. The Sultan on this occasion directed a levy of the population of *Múar* to be made, and the inhabitants to be assembled at *Malacca.* According to the Malay annals, the war between *Siam* and *Malacca* "continued for a long time, and great numbers of the Siamese perished; but *Malacca* was not reduced. At last the whole Siamese army retreated, and as they took their departure they threw down large quantities of their baggage ratans in the district of *Múar,* where they all took root; and that is the origin of the name *Rotan Siam.* Their stocks, which were formed of fig-tree wood, likewise took root in a place in the vicinity of *Múar,* where it still exists. The rests for the Siamese cooking places also took root and grew up, and are to be seen at this day at the place named *Tumang Siam.*" I was unable to find out the locality of the places here mentioned by the author of the *Sejára Malâyu,* though every inquiry was made near the spots where these scenes are said to have occurred. The tradition, however, of the defeat of the Siamese was universally current. In 1511, Ahmed, Sultan of *Malacca,* on his city being taken by the Portuguese, retreated up the *Múar* river to a place called *Pagoh,* about 15 or 16 miles from *Gressik,* now under the *Pánghúlú besar,* Inchi Muit. Sultan Mahmu'd remained at *Battu Hampar,* and founded a fort at *Bentayen.* According to the *Sejára Malâyu,* the Portuguese pursued Ahmed up the river, attacked and took *Pagoh.* Ahmed fled further up to *Panarígan,* near *Jompóle,* and thence, accompanied by Mahmud, repaired to *Pahang.* The latter subsequently established himself at *Johóre.* Many of their adherents remained in *Múar* and *Segámet,* and in course of time erected a primitive form of government, directed by four elders, styled *Tuah Campongs,* who ruled under the Sultans of *Johóre* until 1119 A. H. The four *campongs* were those of *Pagoh, Sungie Ring, Sungie Terap,* and *Gressik.*

A. H. 1119. A *Mantri* of high birth in *Johóre,* named Samade Rája, obtained a grant of the territory of *Múar* from the then Sultan of *Johore*, Abdal Jalil Shah III. He settled at a place called *Pantei Layang* on the banks of the river, and ruled till 1145 A. H., when he died succeeded by his son Padu'ka Tuan; who, on his proceeding to the court of *Johóre*, on the occasion of his father's demise, was invested by the Sultan Abdal Jalil with the title of *Tumúngong Padúka Tuan*. He died A. H. 1175, succeeded by his son Burok or Ahok, who was confirmed by Sultan Abdal Jalil Shah IV., then resident at *Rhio*, whither he had removed from *Johóre*. Burok died at *Búnga Tanjong* on the *Múar* river in 1214 A. H. leaving two sons, Konik and Ibrahim. The former went to *Lingga* to present himself to Sultan Mahmu'd III. by whom he was acknowledged as third *Tumúngong* of *Múar*.

Konik died in 1246, A. H. leaving a son named Syed, the present chief, who succeeded him: he also left a daughter. Syed proceeded to *Singapore*, where he was confirmed by the late Sultan, Hussain Shah I., whom the English had recently placed on the throne of his ancestors. From him he obtained the title *Tumúngong Dattu Syed*.

It would appear from what has been advanced above, and by the subsequent Boundary treaties, that *Múar* has always been feudal to the Sultan of *Johóre* since the time of their ancestors, the ancient sovereigns of *Singapore* and *Malacca*. The Dutch, however, when in possession of *Malacca*, appear to have claimed *Múar*, as in the map of Valentyn the boundary line of the Dutch territory is made to extend so far beyond the *Múar* river as the *Rio Formoso*.

The *Tumúngong's* sway is confined to the villages immediately on the banks of the *Múar* river and on those of the stream of *Segúmet*, which empties itself into the *Múar* about 12 miles above *Pankálang Kóta*. He appears to be popular from his easy temper, and the inhabitants feel alarmed at the idea of any change being made in the government by the Sultan of *Johóre*. We had an interview with this Malay chief at a village, about 18 miles up the river, called *Gressik*. He acknowledges himself a vassal of *Johóre*, and sends annually to the Sultan the amount of a duty levied on the houses of the settlers at *Padang* (one dollar per house) and 200 *gumpits* of rice.

Malayan Albino.—On landing at *Gressik* I was struck by the singular appearance of a Malay lad, an *Albino*, standing under the shade of a tree on the river bank. His skin was of a reddish white, with blotches here and there, and thinly covered with short white hairs. The eyes were small and contracted; the iris of a very light vascular blue; the lids red, and fringed with short white lashes; the eyebrows scant and of the same colour; the pupil much contracted from the light. On calling him to come near he appeared to be ashamed.

He evinced an extreme sensibility to the stimulus of light, from which he almost constantly kept his eyes guarded by shading them with his hands. He told me he could see better than his neighbours in imperfect darkness, and best by moonlight, like the "moon-eyed" *Albinos* of the Isthmus of *Darien.*

He is morbidly sensitive to heat: for this reason and on account of the superstitious respect with which the Malays regard him, he is seldom employed by his friends in outdoor labour, although by no means deficient in physical strength. The credulous Malays imagine that the Genii have some furtive share in the production of such curiosities, though this they tell as a great secret. To this day the tomb of his grandfather, who was also an *Albino,* is held sacred by the natives, and vows *(niyats)* made at it. Both his parents were of the usual colour. His sister is an *Albino* like himself.

Albinos, I believe, are not common on the peninsula, nor are there any tribes of them as, according to VOLTAIRE, exist in the midst of Africa. In the only two instances I recollect observing, the eyes were, in both, of a very light blue; the cuticle, roughish and of a rosy blush, very different from that of the two African *Albinos* seen and described by VOLTAIRE, and quoted by LAWRENCE; "Leur blancheur n'est pas la nôtre; rien d'incarnat, nul mélange de blanc et de brun, c'est une couleur de linge, ou plutôt de cire blanchie; leurs cheveux, leurs sourcils sont de la plus belle et de la plus douce soie; leurs yeux ne resemblent en rien à ceux des autres hommes, mais ils approchent beaucoup des yeux de perdrix." *Essai sur les Mœurs.*

WHITELAW AINSLIE, in his description of the *Albinos* of continental India, ascribes to them the same delicacy of constitution and shyness observable in the Malayan *Albino,* and that they are seldom known to live to an advanced age. The females, he remarks, rarely bear children; but when they do, their offspring is of the natural colour of the cast to which they belong.

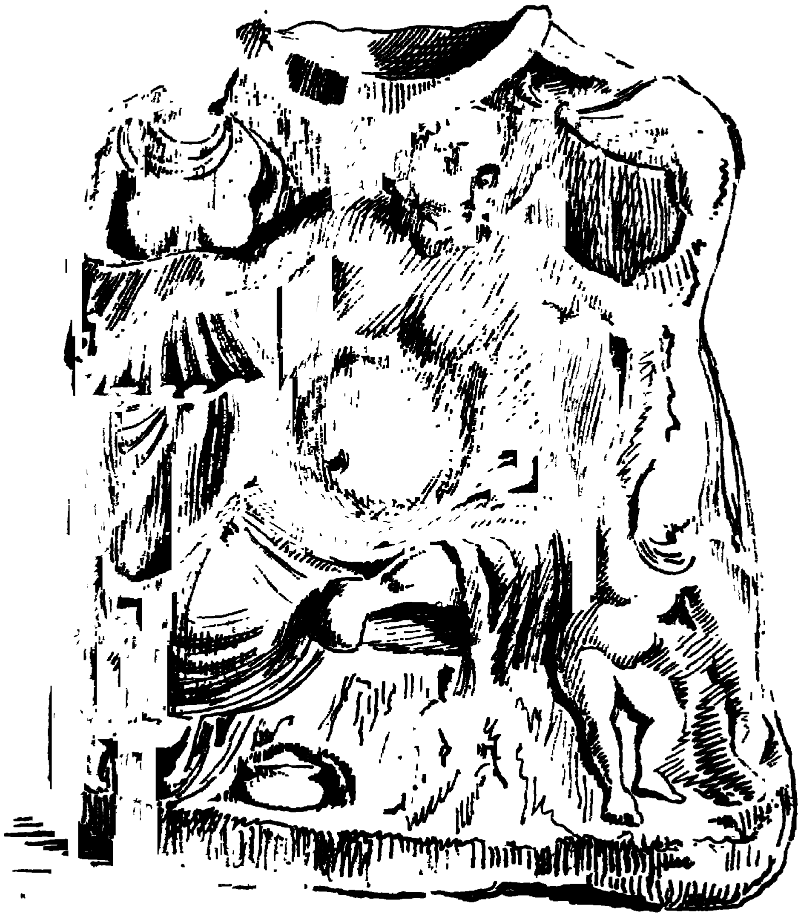
Observations on the Múar river.—The *Múar* river at the mouth has an apparent width of about 600 yards, and at *Gressik* 18 miles up the stream is about 100 yards broad and 7 fathoms deep. The soundings at the bar varied from ¾ to 4 fathoms low water. The current ran at the rate of 2½ miles an hour. It has its rise, according to the natives, among the mountains of *Jellaboo,* and falls into the sea about 30 miles south-east of *Malacca.* From these mountains the *Serting* river, which disembogues itself into the China sea at *Pahang,* and the *Calang* river, which flows into the Straits of *Malacca* near *Salangore,* have also their rise. The general direction of the *Múar* river from the mouth to *Gressik* we found to be N.E.—its course tortuous, the banks for the most part low, muddy, and covered, with the exception of the vicinity of villages and a few *Ladang* clearings, with dense jungle. Among the trees near the river's margin we observed the mangrove, the *Nipah* palm, (the *Nypa fruticans* of Thunberg,) the *Nibong*, (the *Areca Tigillaria* of Dr. Jack,) the *Api-Api*, *(Pyrrhanthus Littoreus,)* the *Pedáda*, the *Neridi*, and the *Búta-Búta*.

The water of the river was more turbid than that of the *Lingie*, which might be owing to the freshes from the hills. The paucity of cultivation, thinness of population, and the almost total absence of trading boats and even fishing canoes on the river, could not fail to strike the most careless observer. By this river there is a communication, almost all the way by water, with the eastern coast of the peninsula, frequently adopted by the *Pahang* traders. The navigation was formerly under the control of a *Bugis* chief named Unku' Kla'na, who settled at the mouth of the river; and, after him, under his son *Rája* Issa: but on the return of the latter to *Rhio* in 1826, it reverted to the *Tumúngong*.

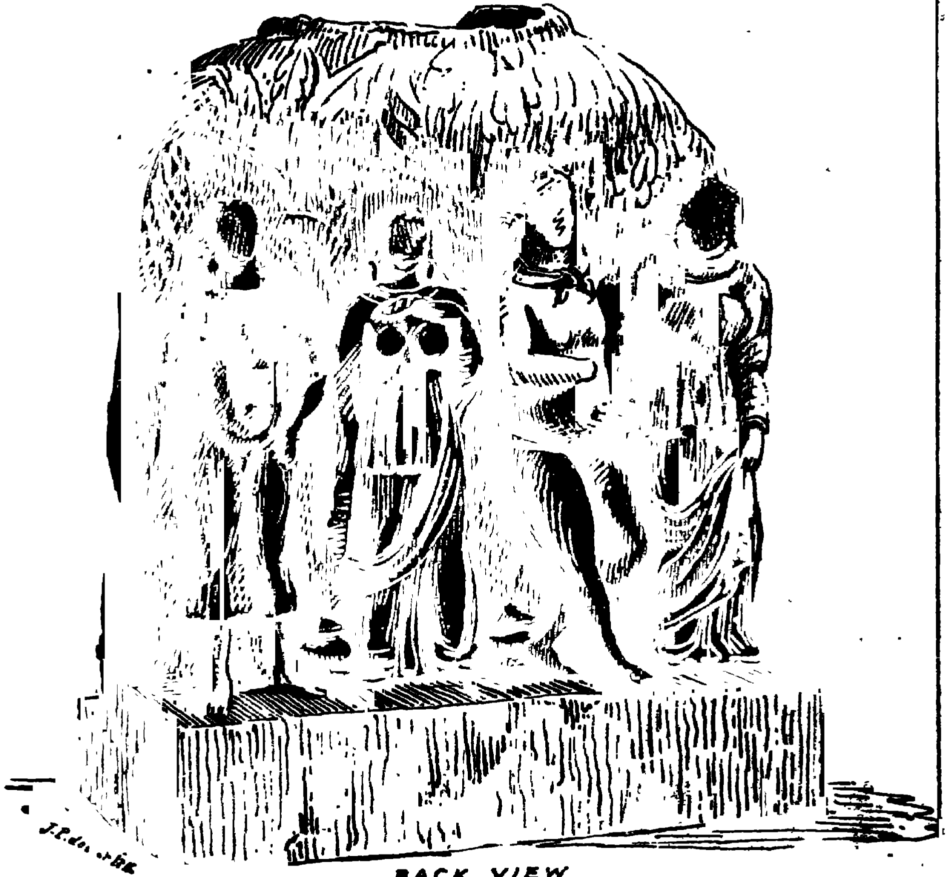
In former days the mouth of the river was a noted place of rendezvous for the fleets of the Siamese, and in later times of the Malay princes, in their attacks on *Malacca* during the Portuguese and Dutch administrations. The last instance occurred in 1784, when *Rája* Hadji, the *Múda* of *Rhio*, anchored there with a fleet of 170 prows on his way to invade *Malacca;* an enterprize in which he lost his life.

Gold Mines of Bukit Ráya.—Gold dust is found a short distance from the left bank of the river at *Bukit Ráya*, a low hill covered with forest, which was pointed out to us by the guides. There were, we were told, formerly gold mines on and at the foot of this hill worked by Malays, who were compelled to quit them through the exactions of the petty chiefs. The *Tumúngong* had brought down with him in his own boat to *Gressik*, two Chinese miners, with the view of ascertaining whether any mining speculations there would be likely to turn out profitably or otherwise. I have not heard the result. Tin is also found near *Bukit Ráya*.

From *Gressik* we saw a range of hills at a great distance running down the peninsula in a south-easterly direction, one of the highest of which is called *Siang-battu*, the Cave of the Rock. From this mountain, the natives affirm, flow the rivers of *Battu Pahat*, (the *Rio Formoso* of the Portuguese,) *Pontian*, *Undówe*, *Roompin*, *Bennoon*, and *Johóre;* the last of which streams empties itself into the sea at the extremity of the peninsula: on its left bank stood the capital of the



"FRONT" VIEW



BACK VIEW

Malay empire of *Johóre.* This range of mountains seems to be a continuation, if I may so term it, of the broken chain running down the peninsula through the States of *Quédah, Perak, Salangore, Súngie-ujong, Rumbówe, Jellaboo,* and *Srimenanti,* terminating near Point *Romania,* and probably having their origin in the lofty ranges which overlook the vast *steppes* of Northern Asia.

VI.—*Note on the discovery of a relic of Grecian Sculpture in Upper India. By Lieut.-Col.* L. R. Stacy. *Plate XXXI.*

[In a letter to the Editor, dated Aligarh, 29th February, 1836.]

I have the pleasure to enclose two sketches exhibiting the obverse and reverse of what appears to me a Grecian perirranterion (Περιρραντηριον (1) in stone (Italian, tazza*). The block, which is three feet in width, three feet ten inches high, and one foot four inches thick at the base, is of the hard red sandstone with white spots, which is found so plentifully in the *Agra* district, particularly in the neighbourhood of *Fattehpúr Sikrí,* and of which the greater number of the ancient buildings at *Agra* are constructed.

This relic was given to me by a friend at *Mathura:* it is in a very mutilated state, but fortunately sufficient development of it remains to determine, I think, its original character and use.

The obverse represents Silenus inebriated; he is reclining on a low seat or throne, supported on either side by a young male and female Grecian. Two minor figures support the knees: the attitude of Silenus, the drooping of the head, the lips, and powerless state of the limbs, give an extremely accurate representation of a drunken man. The figures of the youth and maiden are also in appropriate keeping. The whole is evidently the work of an able artist, who could not possibly, in my opinion, have been a native of Hindustan.

The reverse appears to have been executed by a less skilful person, and the figures carry an Indian style about them. The back-ground represents a grove, and the trees are loaded with fruit. Four figures are conspicuous in front: on the left hand a Grecian girl, with short tunic and loose drapery falling to the ground; her sandals are ornamented; her right hand is grasped by the right hand of the figure next to her, a young man, whose apparel is confined to a *jhangí:* he has a kerchief round the neck with a tie in front as worn by sailors. Next to this is another female in a Grecian dress: she would seem to right, who is in the act of putting on woman's attire. The bracelets

(1) Vide Potter's Grecian Antiquities, vol. i. pp. 224 and 262.

* Vide Moses' Antique Vases, Pl. 95.

be highly amused with the person (a young man) immediately on her of this female reach half way to the elbow, and are most elaborately and beautifully executed, but the appearance of this figure is less elegant than that on the extreme left. At the feet of the group are goblets. The heads of the figures are bound with vine leaves.

The figures on the obverse are on a larger scale than those on the reverse: the deficiency on the reverse is supplied by trees, forming a grove. The whole supports a circular bason or font measuring sixteen inches in diameter, and which must have been originally about eight inches in depth. As already noticed, this relic is sadly mutilated, and it is probable the bigotry of Muhammadans, (who perhaps considered the work connected with Hindu idolatry,) occasioned the injury done to the faces and breasts of all the figures and a great part of the bowl. Enough, however, remains to identify it as representing a scene in the Bacchanalian festivals.

For the present I will simply add, that should this piece of sculpture prove to be what I conjecture it to be, the correctness of Wilton and Jones' (2) opinions will be strongly evidenced, when they asserted a similarity of the gods of the Greeks and Indians, and that this led to intermarriages, and thus the former merged into and were ultimately lost sight of in the Indian community. (3)

Note.—The discovery of a piece of sculpture bearing evident reference to Greek mythology, if not boasting as unequivocally of the beauty and perfection of Grecian sculpture, might excite less surprize after the elaborate display we have lately had of coins found in Upper India and in the Panjáb with Grecian legends, and a combination of Hindu and Greek deities. Yet, in fact, the latter offer no explanation to the former—on the contrary, they relate exclusively to a period comparatively modern, when the worship of *Mithra* spread through the world with the rapidity of the element of which he was the type, and superseded in a great measure the more ancient superstitions; whereas the worship of Bacchus—or of Silenus, his wine-inspired counsellor, must belong to a much more remote period—nor can we trace any clue to it in the present mythology of the Hindus. True there have been traditions preserved in the West, of Bacchus' expedition to India, and of the easy conquest every where following the steps of the hero who could make rivers run with wine—and fought with an army of laughing Bacchantes and satyrs.

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(2) Vol. i. p. 221, Asiatic Researches.

(3) This opinion of Wilton's is quoted in Conder's History of India. I cannot immediately say in which vol. of the As. Researches it is to be found.

The Dionysiacs of Nonnus have been quoted by Colonel Wilford, and analysed by Professor Wilson in our Researches—but without hinting at their hero having been grafted on the pantheistic system of India. *Nishapur, Déva-Nahushanagar,* and other towns, have been pointed out as the site of *Nysa, Nicea,* or *Dionysiopolis,* where the extravagant rites of Dionysos' worship were celebrated with the greatest pomp:—where, according to some authorities, he was born—where, according to others, he founded a city in honor of a damsel, Nicæa, whom he encountered in his expedition through *Persia* and *Bactria*:—but all is vague and uncertain on the subject. The Indian origin indeed of the religion of Bacchus, long ago asserted and believed, has lately come to be suspected from the want of any arguments in its favor but a few slight resemblances of names and ceremonies. Professor A. W. Schlegel expressly denies in his Indian Library, that the Greeks had, previous to the conquests of Alexander, any idea of an expedition of Bacchus to or from India*. The author on whose authority this opinion is repeated, Mr. T. Keightley, thus traces the origin of the confusion:—

"When Alexander and his army had penetrated to the modern *Cábul,* they found ivy and wild vines on the side of Mount Merus and on the banks of the Hydaspes: they also met processions, accompanied by the sound of drums and parti-colored dresses, like those worn in the Bacchic orgies of Greece and Lesser Asia. The flatterers of the conqueror took thence occasion to fable that Dionysius had, like Hercules and their own great king, marched as a conqueror throughout the east: had planted there the ivy and the vine, had built the city of *Nysa,* and named the fountain *Merus* from the circumstance of his birth from the thigh of Zeus. At length, during the time of the Græco-Bactric kingdom, some Greek writers, on whom it is probable the Brahmans imposed, as they have since done on the English†, gave out that Dionysus was a native Indian, who having taught the art of wine-making in that country, made a conquering expedition through the world to instruct mankind in the culture of the vine and other useful arts. And thus the culture of the vine came to Greece from a land which does not produce that plant! This last is the absurd hypothesis which we have seen renewed in our own days, and supported by all the efforts of ingenious etymology!"

Colonel Stacy's group may throw a new light on this curious question. There can be no doubt as to the personage represented by the principal figure—his portly carcass, drunken lassitude, and wine-wreathed forehead, stamp the individual: while the drapery of his attendants pronounces them at least to be foreign to India, whatever may be thought of Silenus' own costume, which is certainly highly orthodox and Brahmanical. If the sculptor were a Greek, his taste had been somewhat tainted by the Indian beau ideal of female beauty —in other respects his proportions and attitudes are good—nay, superior to any specimen of pure Hindu sculpture we possess: and considering the object of the group—to support a sacrificial vase (probably of the juice of the grape)—it is excellent. It would be time well bestowed to survey all the temples and antiquities of *Mathura*, in search for other specimens of Grecian art. Colonel Stacy can have no greater inducement to undertake this pleasing task, than the possession of the highly interesting relic which we have made a faint attempt to introduce to the eye of our readers in the accompanying lithograph.—Ed.

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* Keightley's Mythology of Greece, 170.

† Alluding to Col. Wilford.

VII.—*Description of some Grasses which form part of the Vegetation in the Jheels of the district of Sylhet. By* William Griffiths, *Esq. Assistant Surgeon, Madras Establishment.*

Zizania ? ciliata. *Spreng Syst.* ii. *p.* 136; *Kunth Agr.p.* 10.

Leersia ciliata. *Roxb. Fl. Ind.* p. 207.

Pharus ciliatus. *Retz. Obs.* 5. p. 23.

Gramen in aquosis proveniens, culmis gracilibus basi longe repentibus, articulis cylindraceis pubescentibus, cæterum lævibus.

Folia subglaucescentia, linearia, acuta, supra lineata et tactu scabra, margine subsimplici scabro.

Spicæ paucæ, distantes, subsecundæ, in paniculam nutantem alternatim dispositæ.

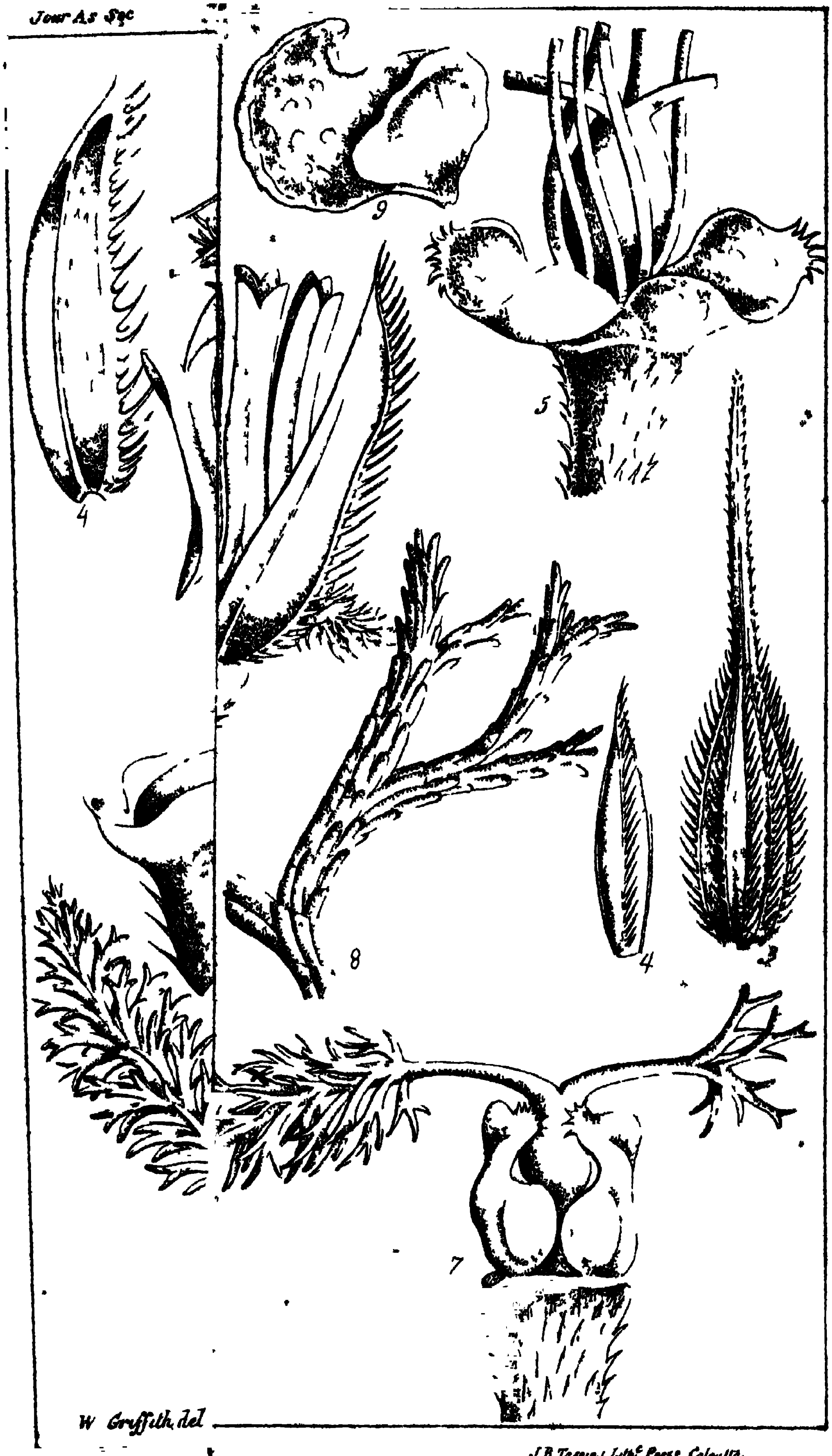
Spiculæ solitariæ, in apice cyathiformi pedicelli curvati articulatæ, subsessiles, unifloræ.

Glumæ nullæ, nisi cupulam membranaceam apicis pedicelli glumam existimes.

Paleæ 2, chartaceo-coriaceæ, compresso-carinatæ, muticæ, obtuse mucronatæ, brevissime stipitatæ, stipite crasso rotundato; exterior 5-venia, venâ mediâ (carinâ) duabusque marginalibus denticulato-ciliatis, duabus intermediis subglabris, interveniis scabris; interior 3-venia, paullo brevior, carinâ denticulato-ciliatâ, intervenio scabro, cæterum læviuscula.

Lodiculæ 2 carnosæ, acinaciformes, integræ, glabræ.

Stamina 6, antheris longe exsertis.



W Griffith del

J B Tassin's Lith^c Press Calcutta

otamochloa Retzii.

Ovarium ovato-oblongum, glabrum. Styli 2. Stigmata plumosa, divisionibus ramosis, ratione stylorum longa.

Caryopsis . . . .

Legimus in aquosis *Jumalpore*, in plagis inundatis, *Jheels* vernacule dictis, *Sylhet* confinibus; in collibus *Khasiensibus* prope *Nunklow;* et nuperius in regione *Assamica* alta; annis 1835-36.

With regard to this grass, we have Mr. BROWN's authority (Prodr. Fl. Nov. Holl. ed. Nees 1. p. 67, sub *Leptaspide)* for its being totally distinct from *Pharus*, to which it was originally referred by RETZIUS. Mr. BROWN likewise points out (loc. cit.) that this and the succeeding, if not retainable in *Zizania*, will constitute a distinct genus. It will be seen that I have ventured to go farther, and I am only deterred from characterizing this as itself distinct, by the difficulty I find in distinguishing it from *Leersia*, with which genus I am only acquainted through M. KUNTH's Agrostographia. Its obvious affinity is with *Oryza*, from the awnless varieties of which it only differs in the total absence of glumes; the presence of the membranous cup terminating the pedicel in *Oryza* proving, that it is not to be considered as a modification of these envelopes.

POTAMOCHLOA. *Griff.*

Syst. Linn. *Hexandria Digynia.* Order, Nat. *Gramineæ*, Juss.

Spiculæ uniflora. Glumæ nullæ. Paleæ 2 membranacco-chartaceæ, carinatæ, apertæ, exteriore in aristam productâ. Lodiculæ 2. Stamina 6. Styli 2. Stigmata plumosa.

Caryopsis. . .

Gramen fluitans ope vaginarum cellulosarum, dense cæspitosum. Folia lata; ligula obsoleta. Panicula effusa erecta; pedicelli infra medium constricti.

POTAMOCHLOA RETZII. *Griff.*

ZIZANIA ? ARISTATA. *Kunth, Agr.* p. 10.

LEERSIA ARISTATA. *Roxb. Flor. Ind.* 2. p. 207.

PHARUS ARISTATUS. *Retz. Obs.* 5, 23, *ex Kunth.*

Hab. In aquis stagnantibus prope *Jumalpore*, et copiosissime in inundatis, *Jheels* dictis, *Sylhet* confinibus. Legimus florentem Septembre, 1835.

Culmi emersi vix pedales, glabri. Immersi longissimi, hinc illinc radiculas capillaceo-divisas emittentes.

Vaginæ immersæ vel semi-immersæ quam maxime cellulosæ, incrassatæ et quasi inflatæ; emersæ longiores cylindraceæ, minus cellulosæ.

Folia in exemplaribus spontaneis semper emersa et erecta*, lanceolata, basi cordata, obtusa, apice sub-cucullata, rigida, suprà tactu scabra.

Panicula erecta, axi ad ejus originem subito angustatâ; rami infimi subverticillati, divaricati, superiores alternantes, ascendentes.

Spiculæ ramis adpressæ, subsecundæ, inferiores geminatæ, inæqualiter pedicellatæ, superiores solitariæ longius pedicellatæ.

Pedicelli clavati, infra medium constricti, ibidemque annulo rubro insigniti, spicularum infimarum curvati.

Paleæ sessiles, apicum pedicellorum continuæ! vix compressæ; *exterior* major 5-venia, venis denticulato-ciliatis, cæterum parce hirta; arista continua, recta, scabra, paleam excedens; *interior* mutica, acuminata, 3-venia, carinâ denticulato-scabrâ, venis lateralibus lævibus, pallidis.

Lodiculæ 2, subacinaciformes, magnæ, extrorsum gibbosæ et carnosæ, introrsum sub-membranaceæ, glabræ vel apice ciliatæ.

Stamina 6. Filamenta longe exserta. Antheræ lineares, longæ.

Ovarium oblongum, glabrum.

Stigmata ratione stylorum longiuscula.

Caryopsis non visa; stipitata?

It is this genus that appears to me allied to *Zizania.* It differs, I conceive, materially from the preceding in habit, in the shape and consistence of the paleæ, which are open during the period of inflorescence, and in the outer one being awned.

VOSSIA. *Wall. et Griff. Mss.*

Syst. Linn. *Triandria Digynia.*

Ordo. Nat. *Gramineæ, Jussieu.*

Char. Gen.—Spica compressa, articulata, rachi flexuosâ excavatâ. Spiculæ in singulo articulo duæ, alterâ sessili, alterâ pedicellatâ, bifloræ. Glumæ 2 dissimiles, exterior chartaceo-cartilaginea, plana, apice in cuspidem producta; interior chartacea, mutica, carinato-navicularis. Flosculi hyalini, mutici; superior (interior) hermaphroditus (in spicula pedicellata sæpius masculus), bivalvis 3-venius. Lodiculæ 2, cuneatæ, dentatæ. Stamina 3. Styli 2. Stigmata plumosa. Caryopsis.. Flosculus inferior masculus, bivalvis, bivenius!

Gramen procerum, fluitans, cæspitosum.

Culmi 3—4-stachyi. Folia longissima, acuminatissima, plana, venâ centrali crassâ albâ. Ligula indivisa, dense ciliata. Diximus in memoriam b. Johannis Georgii Vossii, poetæ Germanorum dulcissimi, eru-

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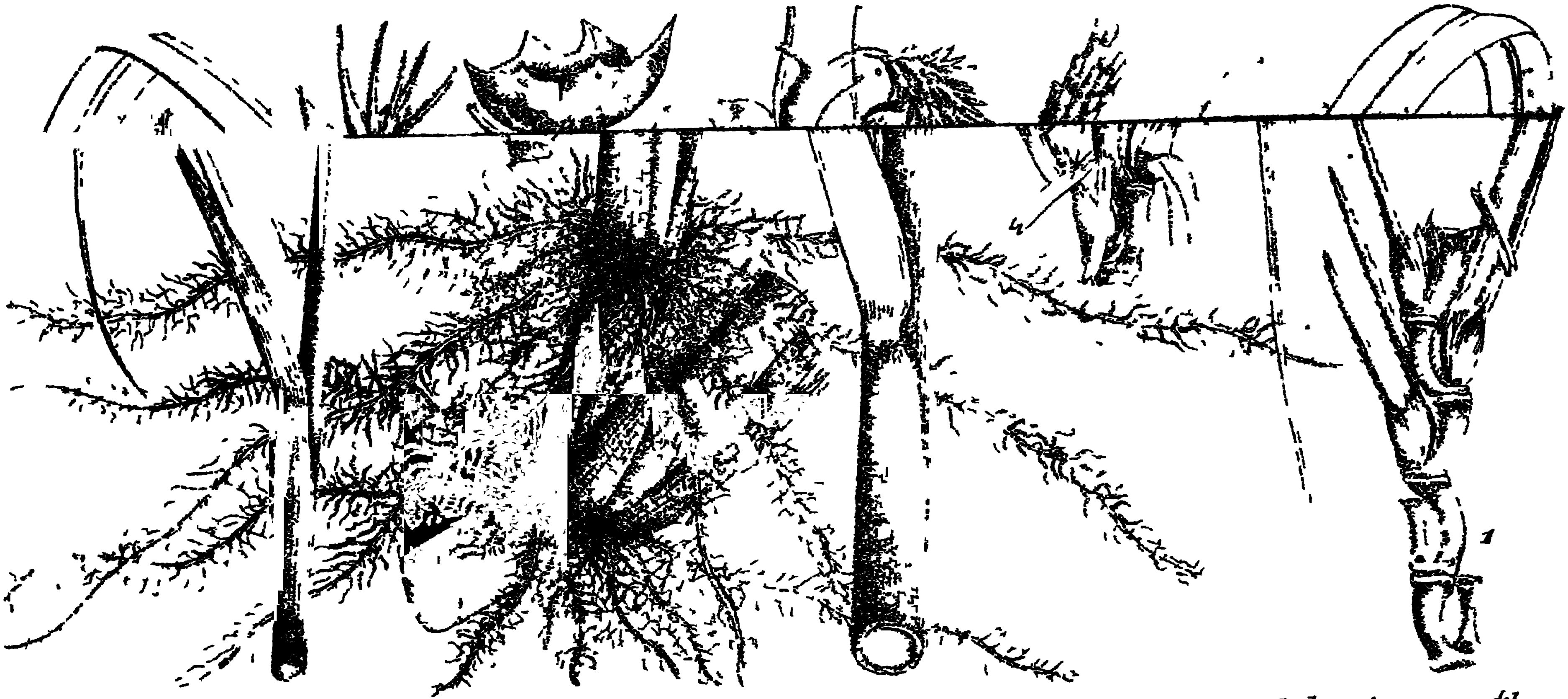
* In exemplaribus in horto botanico Calcuttæ cultis natantia, oblongiora et teneriora.



W Griffith analysen del

Luchmun Sing gramen del

Vossia procera

[illegible]

ditissimi, poematum græcorum et latinorum, imprimis Georgici Virgiliani translatoris et commentatoris locupletissimi, rerum botanicarum et agrestium insigniter periti.

VOSSIA PROCERA. *Wall. et Griff. Mss.*

ISCHÆMUM CUSPIDATUM, *Roxb. Flor. Ind. ed. Carey,* 1. p. 325. *Kunth,* Agr. 1. p. 516.

Hab. In inundatis vernacule *Jheels* dictis prope Hubbeganje, fluminis *Barak*, Bengalæ orientalis. Florentem invenimus mense Septembris, 1835.

Gramen glaucescens, in aquis stagnantibus leniter fluentibus profundis nascens. Culmi immersi longissimi, crassi, cellulosi, radiculas capillaceas ad geniculas emittentes, emersi 3—4-pedales, vaginis laxis, compressiusculis, tactu scabris undique tecti. Vaginarum axillæ gemmiferæ ; colla dense barbata. Ligula brevis truncata.

Folia lineari, ensiformia, basi subcordata, longissime subulato-acuminata, 2, 2½ pedalia, supra parce pubescentia, infra glabra, venâ centrali crassâ, albâ, supra planâ, subtus prominulâ, marginibus cartilagineis antrorsum denticulatis.

Spicæ terminales, binæ vel ternæ, rarius quaternæ, digitatæ, 6—8-unciales, patentes, subnutantes, laterales subsessiles, rudimento alterius interdum adjecto, terminalis pedunculata, insertionibus cartilagineis plus minus hispidis. Rachis introrsum planiuscula, extrorsum convexa ; flexuris dextrorsis sinistrorsisque, marginibus scabris. Spiculæ pedicellatæ, infimæ summæque tabescentes. Pedicelli spicularum inferiorum articulis paullo longiores. Gluma exterior dorso plana, venoso-striata, apice producta in cuspidem ensiformem, longam, glumam ipsam fere bis superantem, rectam, vel subundalatam, venoso-striatam, marginibus denticulato-scabris.

Interior navicularis, carinâ obliquâ a medio suprâ scabra, breviter mucronata, irregulariter venosa, venâ centrali nunc incompletâ, intermediis incompletis et sæpius, præsertim spiculæ sessilis, cum vena centrali arcuatim confluentibus.

Paleæ flosculi exterioris masculi membranaceæ, complanatæ, biveniæ ! exterior apiculo brevi pubescente : marginibus mutuo involutis subciliatis.

Lodiculæ 2, carnosæ, maximæ, cuneatæ, angustiores quam in flosculo hermaphrodito, dentatæ. Antheræ longe exsertæ, lineares, luteæ. Pollen globosum, inæquale, læve. Rudimentum fœminei nullum.

Paleæ flosculi interioris hermaphroditi consimiles, sed exterior trivenia: Lodiculæ staminaque ut in mare. Ovarium subobovatum, glabrum. Styli duo, umbone nullo interjecto.

Stigmata ratione stylorum longa, ramis denticulatis. Caryopsis...

Spiculæ stipitatæ flosculi minores, et superior interior rarius hermaphroditus.

Obs. Genus habitu quodammodo Tripsaci, Hemarthriæ accedens, sed discrepans præcipue pedicellis flosculorum exteriorum glumisque interioribus spicularum sessilium solutis, nec axi adnatis, flosculisque exterioribus bipaleaceis masculis, nec unipaleaceis neutris. Ab Ischæmo differt præcipue paleâ exteriore flosculi hermaphroditi (superioris) muticâ.

PANICUM BRUNONIANUM. *Wall. et Griff. Mss.*

Paniculâ effusâ, spiculis 1 vel 2 infimis sessilibus et in axis excavationibus seminidulantibus, reliquis exsertis sæpissime solitariis, rachillâ in aristam spiculam duplo superantem productâ, foliis linearibus 3-veniis vaginisque glabris, ligulis 3-dentatis.

Hab. In aquis leniter currentibus profundis plagarum *Bheels* dictarum prope *Goalnagar;* florens Septembre.

Gramen fluitans: culmi longissimi, compressiusculi, ad geniculos radicantes. Vaginarum colla nuda. Ligulæ dens intermedius minor. Folia linearia, 2—3-uncialia, obtusiuscula, 3-venia, marginibus subsimplicibus denticulatis. Panicula terminalis, ambitu ovata, subglabra, axi inferne tetragonâ et excavatâ. Spiculæ 1 vel 2 infimæ in excavationibus seminidulantes; reliquæ exsertæ sæpissime solitariæ; rachilla scabra ultra spiculam quamque si unica, ultra terminalem si geminata, in aristam subulatam, antrorsum denticulatam producta. Gluma exterior minima, membranacea, evenia, subcrenulata, decolorata; interior lanceolata, acuta, mutica, venosa (sub-13-venia,) marginibus parum involutis subciliatis. Flosculi dissimiles; exterior masculus, duplo triplove major: palea exterior glumæ interiori similis, sed scabrella et margines magis involuti; interior duplo minor breviorque, membranacea, glabra, apice bifida, dente setiformi minimo interdum interjecto, venis 2 indistinctis infra apicem evanidis. Lodiculæ 2, paleæ interiori omnino externæ, oblongæ, subrhomboideæ, integræ. Stamina 3, antheris rubro-sanguineis. Paleæ floris interioris fœminei membranaceæ, muticæ, ovato-lanceolatæ, exterior evenia! interior latior, magis obtusa et involuta, incomplete bivenia. Staminum rudimenta tria. Lodiculæ 2 angustæ, interdum coalitæ? Styli 2, imâ basi coaliti, longi; stigmata plumosa, purpurascentia, ratione stylorum longissima. Caryopsis non visa.

This species belongs to the last section of this extensive genus, as given in Mr. BROWN's Prodromus; it is interesting, as it seems to be the only species of the section hitherto found out of New Holland.

In the disposition of the sexes it agrees with Isachne, but differs from it in habit, in the relative size of its glumes, and in the consistence of its paleæ. From Chamæraphis this section differs only, we are told by Mr. Brown, in the number of its styles. The curious prolongation of the rachilla beyond the terminal spicula likewise occurs in some genuine Panica.

REFERENCES.

Plate XXIII. Vossia procera. Figs. 1, 2. Portions of a spike viewed on different faces. 3, Spicula detached. 4, Exterior glume viewed on its inner face. 5, Outer palea of the inner hermaphrodite flower three-veined (by a fault in the transfer the central vein in the original drawing has been left out.) 6, Inner palea of ditto two-veined. 7, Outer palea of exterior male flower, two-veined. 8, Inner ditto, two-veined. 9, Inner glume, viewed laterally and on its inner face. 10, Pollen. 11, Ovarium, or rather Pistillum, with the two lodiculæ and the three filaments in situ. 12, Outer view of lodicula. 13, Inner view of ditto, the lateral stamina separate with these. 14, Portion of a branch of the stigma.

Plate XXIV. Left half. Zizania? ciliaris. Fig. 1, Spicula. 2, Apex of pedicel, much enlarged. 3, Ditto with lower portion of the outer palea. 4, Lateral view of inner palea. 5, Lateral view of lodiculæ, stamina and pistillum; paleæ removed. 6, Pollen. 7, Pistillum. 8, Portion of a branch of the stigma. 9, Genitalia, relative situation, from a young spicula; anthers removed, and the lodiculæ displaced.

The same plate, right half. Potamochloa Retzii. Fig. 1, Spicula with its pedicel, that of the second pedicel removed at the time of expansion. 2, Portion of the pedicel, shewing the construction. 3, Outer palea, dorsal face. 4, Inner ditto ditto. 5, Ovarium, stamina and lodiculæ, the two former in situ, the latter displaced. 6, Pollen. 7, Ovarium, styles and stigmata with the lodiculæ in situ. 8, One of the divisions of the stigma. 9, Lodicula, inner face.

VIII.—*Notes on Delhi Point, Pulo-Tinghie, &c. and on some Pelagic Fossil remains, found in the rocks of Pulo-Ledah. By* Wm. Bland, *Esq. Surgeon H. M. S. Wolf.*

[Accompanying specimens presented to the As. Soc. 4th July, and deposited in the Museum, next to those presented by Dr. Ward from Penang and Queda.]

Where the Malay peninsula terminates in the China sea, there is a tongue of land, called by the natives *Delhi Point*, somewhere about 104 E. longitude, for it is not very correctly laid down. Reefs are found here, running to the southward and eastward, upwards of a mile at low water. Along shore, for the space of two or three miles, is strewed with large masses of *scoriæ* many feet thick, hard, and emitting a metallic sound. Specimens Nos. 1 and 4 will show the kind of vesicular masses mentioned; long lines of perpendicular strata are found stretching generally parallel to the shore, from three to eighteen inches in thickness, of which No. 6 is a specimen. Indurated clayslate, No. 9, is likewise seen in layers running parallel, and in juxta-position to Nos. 1 and 2, of a few inches in breadth. Quartz was found, No. 5, in layers from one to two inches in thickness, accompanying the others and occasionally crossing them, and again continuing its course: imbedded masses of siliceous matter occurred both in the *scoriæ* and in the strata. A nucleus, five or six feet in diameter, was examined, which presented the appearance as if lava in a liquid form had been forced up from below, with a gyrating motion; circular layers having different shades of colour becoming wider and more extended, and were found edging away into straight lines parallel to the other strata. Of the tube marked No. 2, many were found from half an inch to two inches diameter; whilst No. 3 was got at the outer edge of the stratification. Of the remarkable specimen No. 10, abundance were seen, always standing up an edge: above the general level, and occasionally many feet in length, a piece might be found large enough to furnish forth the reticulations of a good-sized Gothic window.

At the N.E. point of the reef, within a few yards of the sandy beach, and dry at low water, was found a fossil tree, of which No. 11 is a specimen, standing at least 15 feet high and of considerable diameter, attached to a mass of rock of the same kind, and so good was the resemblance to a decayed tree, that some of the seamen called out, 'Come and see a tree grilled into stone by the heat.' The fossil in question must have been in a decayed state previous to its exposure to the mineralizing process, and it is the more remarkable, as it now stands, to all appearance, as it originally stood when alive:—it is the same as No. 9, composed of argillaceous schist. A specimen of coral No. 7, which has been exposed to the same general igneous agency as the masses scattered around, and found in the masses themselves, Madrepore No. 8, but the whole of the reef has coral of recent growth scattered over it, in all states and ages. Our stay on this point only extended to a few hours: little opportunity was given for minute observation, but it is a field well worthy the attention of future travellers in that quarter.

Pulo-Tinghie will be found in the charts to the northward and eastward of *Delhi Point:* this island rises to a considerable altitude, and terminates in a graceful truncated cone, with a lower cone seen to the southward of the former. The general surface presents irregular ridges radiating from the cone as a centre, running down to the circumference, i. e. the water's edge, which disposition of surface often obtains in volcanic islands. Be this, however, as it may; we found *Pulo-*

Tinghie densely covered with jungle, most difficult to penetrate, without more time than our public duties permitted; hence the specimens are not numerous, and were found along shore, generally from masses lying about. No stratum was seen. The island terminates to the eastward in a high reddish coloured cliff, but at which we had no opportunity of landing.

Nine specimens marked Pigeon island, from a moderately high and cliffy islet some miles to the southward of *Pulo-Tinghie,* obtaining its name from the abundance of a fine cream-coloured pigeon, having the wings and tail tipped with black; the same bird which is found on the small islands on the *Tenasserim* coast. No. 25, from a large mass partly beneath the surface of the sea. 21, high cliffs around, as well as No. 22.

Returning from the eastward, we had an opportunity of examining a group of small islands called *Pulo-Romania.* These islets, about two miles to the southward of *Point Romania* on the Malay peninsula, are partially covered with wood, and appear to be formed chiefly of granite of two kinds, which was seen checquered by fissures in all directions, and intersected by Nos. 34 and 35, found standing above the general level in narrow ridges, the granite being more easily disintegrated than the intersections themselves. No. 31 found in layers of various thickness, and No. 29 in large irregular masses some 15 feet in length, on shore or partly immersed in the sea.

Enclosed are thirty specimens, from a remarkable group of islands, lying between *Jan Salang,* (Junk Ceylon) and *Pulo-Pinang,* parallel to the kingdom of *Quédah* and in sight of the mainland. Passing over many islands visited, all of which will be found worthy the attention of the geologist, and the ornithologist, as well as the conchologist, I shall only mention *Pulo-Ledah,* as one of considerable importance, from the circumstance of pelagic fossil remains being found in the rocks.

Pulo-Ledah dedarat, literally in the Malay language, 'Tongue island in shore,' to distinguish this from another *Pulo-Ledah de laut,* or 'Tongue island at sea.' This island is about a mile and a half in circumference, and rises to the height of 4 or 500 feet, crowned by a castellated looking rock with perpendicular strata: the whole appears composed of limestone, having a considerable proportion of siliceous matter deposited in it, with veins of quartz a few inches in breadth occasionally intersecting it. The general rock was found stratified from one to three or four feet in thickness, lying at an angle about 45° dipping to the eastward; all the surface, wherever exposed, is rough and uneven, of which Nos. 15 and 24 are specimens. Numerous caverns were found whose roofs not being so exposed were more smooth, which caves have been evidently formed by the action of the waves impinging against the rocks; which action is still going on in certain situations. Some caverns were situated higher up, and not now exposed to the same agency, but it was noticed in a few of them that the entrances were smooth, similar to those in various parts of the world, which have been used, and smoothed down by the ingress and egress of wild animals: it turned out, however, in this case, that the agent that had worn these entrances was man himself, for these caves furnish him with troglodytic abodes during the season for collecting the nests of the Hirundo esculenta.

Your attention may be more particularly called to the north side of *Pulo-Ledah*, where will be found large masses of the same rock, from 20 to 30 feet in length and breadth, and 10 feet in thickness, lying in juxta-position, and no doubt originally deposited en masse, but having been raised unequally, have been broken into their present form and appearance. These masses were found rich in fossil remains; quantities of testaceous deposits were seen in all directions, partly above the general surface, undergoing disintegration along with the matrix in which they were imbedded. Of the fossil nautilus, No. 16, many were seen, as well as some others, concerning which some doubt may remain whether or not they are ammonites. As to the nautilus no doubt can exist, for the plain concave septæ dividing the chambers of the shell are well marked, with the siphuncle in the middle. Had time and better tools permitted, better specimens would have been procured; but the matrix was found very indurated, and it requires time to take such specimens out of hard stone, in a perfect state. The labourer, always worthy of his hire, would here be richly repaid for his time and trouble.

I add the rough sketch of a shell as it was found lying in the matrix, and of the natural size, which gives a tolerable idea of its general appearance. Siliceous cylinders No. 22, occur frequently, and a back bone was found in a fossilized state: from the round cup-like appearance of the vertebræ, it is most probably that of a fish.

Pulo-Ledah is one of the Lancavies, as well as *Pulo-Trotto*, (Giant's island,) an island, high, mountainous, and worthy of being better known; and *Pulo-Tloer* (Egg island) is a small one; but the whole of the islands in question will be found interesting, as on this subject of fossil remains many of your correspondents in India are devoting their time and attention with great success. I am sorry our time among the islands mentioned was so limited, but it is enough that I have pointed them out as a field worthy of future research, as well as the main land opposite.

IX.—*Fossil Remains of the smaller Carnivora from the Sub-Himálayas.* *By Lieut.* W. E. Baker *and Lieut.* H. M. Durand, *Engineers.*

The specimens which are the subject of the following note form a part of the Dadúpúr Collection, and comprise varieties of the genera, *Felis*, *Canis*, and *Gulo*.

The comparison of such, with their existing representatives, must necessarily be less satisfactory than that of the large Pachydermatous genera, which being local in their habitats either contain few species, as the Elephant, Hippopotamus, and Tapir, or when, as in the Rhinoceros, the varieties are more numerous, the size of the animals, and the striking peculiarities of their osteology have claimed for them a minute description and comparison from Cuvier. On the other hand, the smaller carnivorous tribes have a far wider distribution, and their species are as numerous and as varied as the climates under which they are found; their distinctions are chiefly drawn from the external characters of the animals. Minute differences in their osteology, if they exist at all, escape the attention of the naturalists who describe them, and would, in fact, possess little interest except for the fossilist.

We should not be warranted in pronouncing any particular fossil to belong to an extinct species, without having previously compared it with all the known varieties of its genus; and even were such extensive means of comparison in our power, its result could not be decisive*, so long as there remained unexplored regions, whence new varieties might be derived. We shall, therefore, content ourselves with negative conclusions drawn from comparison of our fossils, with the skulls of those species only of their existing congeners now inhabiting the neighbouring districts, none other being at our command. Such conclusions, we hope, will not be without geological interest; as, if we succeed in establishing one or two points of marked difference, they will be sufficient proof that the animals now inhabiting these provinces are not the lineal descendants of those whose remains are entombed in the strata of their soil, and thence may be inferred the occurrence of some great geological change during the lapse of ages, which have intervened between the periods of their several existence.

Felis.

Of this genus there are traces of several varieties among our fossils, but as the larger ones, with the Hyena and Canis, may form the subject of a future paper, we will confine our present notice to the Cat. The cranium represented in fig. 1, Pl. XXVII. though somewhat mutilated, is sufficiently perfect for comparison. The most serious injury which it has sustained (as being the only one affecting the measurements) is a slight crush or compression, which has apparently flattened, and perhaps widened the cranium. The proportions between the fossil and the skull of a common-sized wild or jungle cat are as follows :—the length from posterior of occipital condyle to anterior of canine tooth being taken as the unit or modulus, and those dimensions only being collated, in which the greatest differences exist. The two skulls may be understood to correspond in other respects.

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* For instance, in the 52nd No. of the *Journal As. Soc.* Mr. Hodgson describes two new species of *gulo* and one of *felis*.

	Recent.	Fossil.
Length from post. of occipital condyle to ant. of canine tooth, assumed at	1,000	1,000
Greatest breadth of cranium opposite mastoid processes,..	,508	,581
Height of occiput from lower margin of foramen magnum to top of transverse ridge, ...	,301	,333
Breadth across the occipital condyles, ...	,267	,346
Ditto measured externally across most prominent part of line of molars,..................................	,427	,489
Height of orbit perpendicular, but measured in plane of orbit's margin,....................................	,289	,257

The differences of proportion exhibited by the foregoing comparison are, as will be seen, very trivial. Setting aside the excess in breadth of the fossil's cranium, which if not caused is at least exaggerated by the crush before alluded to, there will remain no remarkable points of difference except in the diameter of the orbit, and in the width across the occipital condyles. The other variations probably exceed not what may be detected in the skulls of cats belonging to one species. There are, however, other differences of form not shewn by the measurements. In the fossil, the post. orbitary apophysis is more developed, and the plane of its projection more continuous with that of the frontal bone. The depression of the cranium in rear of this apophysis is more marked, giving a greater width to the temporal fossæ;—the bullæ of the mastoid processes have a more elongated shape, and are generally larger; and the transverse ridge of the occipital bone is higher, sharper, and more prominent. All, or nearly all, these differences, tend to shew a greater development of the predacious faculties in the fossil,—a circumstance further confirmed by the teeth, which, though precisely corresponding in form with those of the cat, are somewhat larger and stronger.

The lower jaw occupying the central place in fig. 2, must have

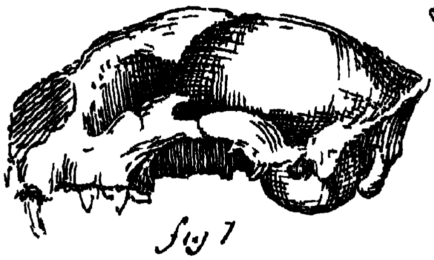
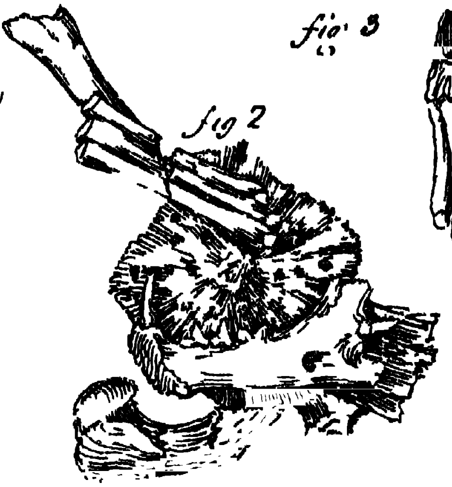


fig 1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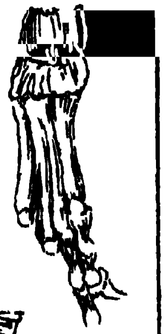
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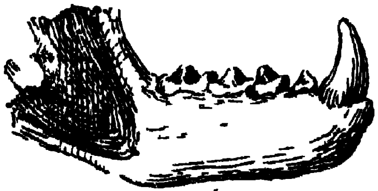
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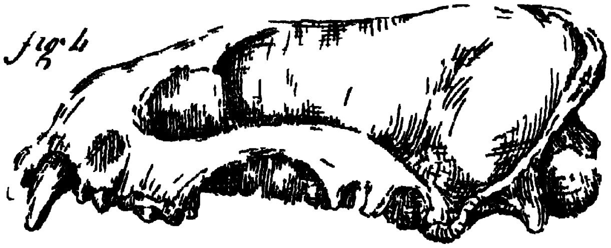
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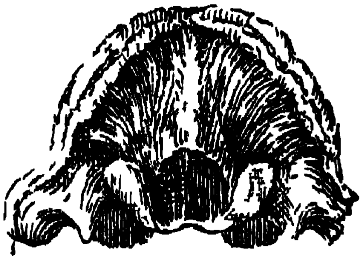
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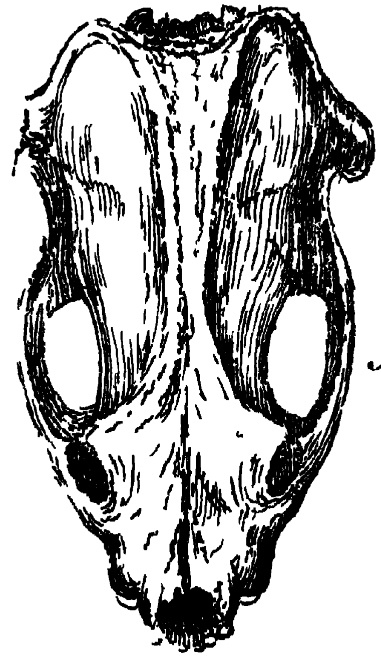
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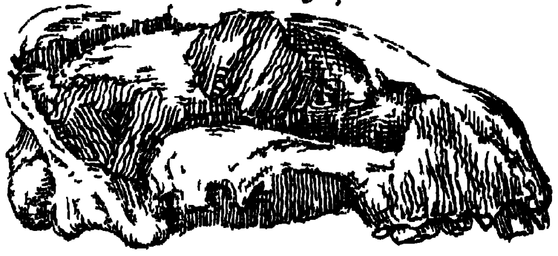
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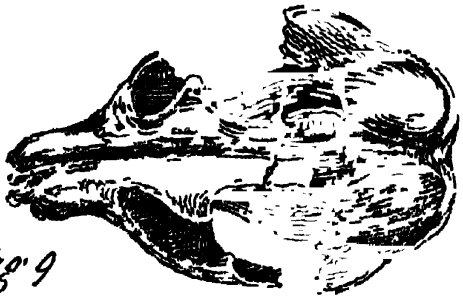
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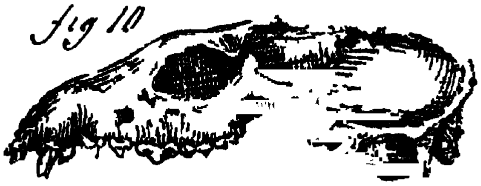
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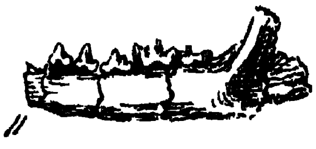
fig 11

fig 12

Scale ½ Nat Size

SubHimalayan Fossil Remains of the Smaller Carnivora

belonged to a smaller animal than that which owned the cranium: it presents no difference worthy of note, from the lower jaw of the wild cat. The humerus, tibia, and metatarsal bones, forming part of this interesting little group, appear to have belonged to the same individual as the lower jaw, and it is curious enough that their present bond of connection is the plate of a small crocodile. The carpal, metacarpal and phalangal bones represented in fig. 3, obtained from the same locality, though at different times, may possibly be assigned to the same or a similar animal.

GULO.

Of this genus we possess the fossil skulls of two individuals, one of which, represented in fig. 4, is nearly perfect: the lower jaws have been separated at their symphysis and otherwise somewhat mutilated, but as they were not found attached to the cranium, we may consider ourselves fortunate in having obtained them at all. The second cranium, fig. 7, has suffered considerable mutilation, and is without the lower jaws: we have, however, inserted it in the plate, because though otherwise less perfect, it has escaped a crush, which appears to have flattened fig. 4. Some differences of proportion between the two fossils would be accounted for under this supposition.

The recent skulls with which we have compared the above mentioned fossils belong to an animal known by the Hindustani name *Bíju* بیجو identical, or nearly so, with the Cape *Ratel*, (*Gulo Capensis*, Desm.)

In classing the *Biju* and *Ratel* under genus *Gulo*, we follow the common system of arrangement; though, as remarked by CUVIER*, both the number and character of their teeth would rather place them with the *Mustela Putorius*. They appear, in fact, to be indebted to their plantigrade motion alone for a place among the *Gluttons*. The fossils now under consideration correspond in dentition with the *Ratel* and *Biju*, and the following table will shew that their resemblance to the latter in most other respects is very strong.

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* Il convient d'autant mieux de comparer le Ratel au Glouton, que ces deux quadrupèdes sont à peu près de même taille; mais outre que le Glouton a six molaires de plus que le Ratel, le crâne de celui-çi est plus large en arrière, son front moins élevé, son orbite moins cerné, ses arcades zygomatiques moins hautes, et l'apophyse coronoïde de sa machoire inférieure beaucoup moins haute, plus large, et plus obtuse. Les rapports du Ratel avec le putois, d'apres ses dents et sa tête, sont certainement plus importans que les différences de marche. *Ossemens fossiles.*—Tom. IV. Chap. VI.

	Recent Biju.	Fossil.	
		Fig. 4,	Fig. 5.
Extreme length from posterior of occipital condyles to anterior of incisors, taken as the modulus, and assumed at	1,000	1,000	1,000
Breadth measured across mastoid processes, ...	0,581	0,592	0,610
Greatest breadth of cranium opposite mastoid processes,..	0,467	0,443	0,474
Least ditto ditto at temporal fossæ, ...	0,226	0,258	0,262
Height of occiput from inf. margin of foramen magnum to sup. of occipital ridge, ...	0,318	0,307	0,343
Breadth of ditto from point to point of styloid processes,	0,335	0,361	0,394
Ditto across the occipital condyles, ...	0,243	0,241	0,248
Ditto of frontal from point to point of post. orbitary apophyses,..	0,286	0,327	0,313
Ditto greatest across zygomatic arches, ...	0,546	0,543	0,561
Ditto exteriorly across the superior canine teeth, ...	0,220	0,238	0,236
Perpendicular diameter of occipital foramen, ...	0,088	0,091	0,108
Length from anterior of canine teeth to post. of tuberculous teeth, measured externally,......................	0,282	0,287	0,287
Breadth of upper jaw measured across carnivorous molars,	0,347	0,339	0,325
Greatest antero-posterior diameter of canine teeth, ...	0,058	0,071	0,067
Width of tuberculous molars, ...	0,081	0,073	0,069

The two fossils, though differing considerably from each other, agree in the following points of dissimilarity from the recent skull. Their canine teeth are larger and stronger, and their tuberculous molars smaller; the two lines of molars converge towards the muzzle considerably less in the fossil than in the recent, and the individual false molars are set less obliquely to the line of maxillary. The frontal is wider between the orbits; the post. orbitary apophyses more prominent, and the depression of the cranium in rear of them less deep; the exterior portion of the mastoid processes has a far greater development (fig. 8); the transverse occipital ridge is thicker, more rugged and more prominent, and projects considerably beyond the plane of the occiput in the prolongation of that of the parietal bones (fig. 5). Measurements of the recent and fossil lower jaws exhibit no differences save in the canine teeth, which severally correspond with the same teeth in the upper jaw. There is, however, in the fossil (fig. 6) a deep depression in the ramus, which in the recent species is nearly flat. In our specimen this depression is as marked as in the tiger and other feline animals. The differences above noted, as before remarked with regard to the cat, tend to prove that the ancient species was even more powerful and savage than its present representative, the *Biju* itself, by no means deficient in these qualities. The three recent skulls examined on this occasion had all suffered more or less from the violence to which the vigorous self-defence of the animals had obliged their captors to resort.

Canis Vulpes.

The specimen represented in figs. 9 and 10, though fortunate in possessing both lines of molars complete, has suffered much from a crush by which the whole posterior portion of the head has been flattened and disfigured. The dimensions selected for comparison in the following table are those least likely to be affected by the accident. Our recent specimen belongs to an adult male fox, of a species common in the N. W. provinces of India. Its size, the colour of its fur, and other external characters, appear to correspond with the description of *C. Corsac* (Pallas), which Cuvier is inclined to identify with *C. Bengalensis* of Pennant—figured also in "Hardwicke's Illustrations," Pl. II. Parts XV. and XVI.

	Recent.	Fossil.
Length from occipital condyle to anterior of canine, taken as modulus, and assumed at	1,000	1,000
Breadth measured across mastoid processes,	,390	,433
Least breadth of cranium at the temporal fossæ,	,205	,206
Breadth from point to point of styloid processes,	,253	,298
Ditto across occipital condyles,	,202	.251
Ditto of frontal from point to point of post. orbitary apophyses,	,287	,295
Greatest breadth measured externally across both lines of molars,	,338	,319
Horizontal diameter of occipital foramen,	,130	,133
Length occupied by line of molars and canine taken together,	,500	,470
Ditto ditto molars alone,	,410	,415

The chief differences here exhibited are those of greater breadth in the posterior portion of the fossil's head, and must, though they appear natural, be liable to the suspicion of having been caused more or less by the crush before alluded to; but there are some points of dissimilarity which must be considered free from this objection. The transverse occipital ridge is thicker and higher in the fossil; the post. orbitary apophyses are altogether broader and more prominent; the hollow or depression in their upper surface, forming a valley between the outer edge of the apophysis and the swell of the frontal, (constituting one of the distinctions between the fox and the other varieties of canis) is in the fossil more marked. From the rear of these apophyses start two ridges, which at first converge towards the occiput in a curvilinear direction, until the distance between them is reduced to about half an inch, after which they run nearly parallel for some distance, and then converge again, till they unite near the occiput and become blended with the parietal crest. We have been particular in describing this formation, as a very similar one was observed by Cuvier in the skull of the "Renard Tricolor," *C. cinereo-argenteus*, Linn. It will be observed from the table of measurements, that the length occupied by the molars and canine teeth together is less in the fossil, while that occupied by the molars alone is proportionally greater. This difference is only apparent, and is caused by the advanced position of the first false molar close to the root of the canine; the tooth is probably a deciduous one, not yet replaced by the permanent molar; the unworn state of the other teeth also attesting the youth of the fossil, at the period of its demise. The lower jaws, figs. 11 and 12, are not sufficiently perfect to afford any satisfactory measurements. Fig. 11 is the external view of the left; and fig. 12 the internal of the right lower jaw.

To the foregoing observations we have nothing further to add than that, in our opinion, they point out sufficient proof of specific differences between the several objects compared; but, for the reasons before adduced, we must limit our conclusions to this, and cannot therefore venture upon giving new names to our fossil species.

Measurement of Fossil Skulls, &c. represented in Plate XXVIII. figs. 1 *to* 10.

Detail of Measurement.	Felis fig. 1.	Felis fig. 2.	Gulo figs. 4 5 & 8.	Gulo fig. 7.	C. Vulpes 9 & 10.
	ins.	ins.	ins.	ins.	inches.
Extreme length from post. of occipital condyles to anterior of incisor teeth, ...	3,50	..	5,51	5,08	4,09
Ditto ditto ditto canine ditto, ...	3,27	..	5,13	4,86	3,83
Breadth measured across mastoid processes, ...	1,67	..	3,26	3,10	1,66
Greatest breadth of cranium opposite mastoid processes, ...	1,90	..	2,44	2,41	1,71
Least ditto ditto at temporal fossæ, ...	1,26	..	1,42	1,33	0,79
Height of occiput from lower margin of occipital foramen to top of transverse ridge, ...	1,09	..	1,69	1,74	0,90
Breadth from point to point of styloid processes, ..	..	..	1,99	2,00	1,14
Ditto across the occipital condyles,...	1,13	..	1,33	1,26	0,96
Ditto of frontal from point to point of post. orbitary apophyses, ...	1,80	..	1,80	1,59	1,13
Greatest breadth across zygomatic arches, ...	2,72	..	2,99	2,85	..
Breadth measured externally across superior canine teeth,....................................	1,00	..	1,31	1,20	..
Ditto ditto most prominent points of line of molars,	1,60	..	1,87	1,65	1,22
Perpendicular diameter of occipital foramen, ...	0,45	..	0,50	0,55	..
Horizontal ditto ditto, ...	0,55	..	0,62	0,60	0,51
Length from exterior of incisors to anterior of palatal sinus, ...	1,52	..	2,40	2,00	..
Ditto from anterior of palatal sinus to lower margin of occipital foramen, ...	1,68	..	2,56	2,70	2,05
Ditto occupied by molars and canine teeth, taken together, ...	1,24	..	1,58	1,46	1,80
Ditto ditto molars alone,......................	0,95	..	1,25	1,17	1,59
Diameter of orbit perpendicular, but measured in plane of orbit's margin, ...	0,84	..	0,62	..	0,58
Ditto ditto from point of post. orbitary apophysis to ant. margin of orbit,.........................	..	..	0,79	..	0,74
Greatest antero-posterior diameter of canine tooth,	0,19	..	0,39	0,34	0,18
Width of tuberculous tooth, (in *Felis* and *Gulo*,) ..	0,14	..	0,40	0,35	..
Lower Jaw.—Length from posterior of condyle to anterior of canine, ...	..	2,13	3,20	..	..
Ditto from ditto ditto to posterior of molars, ...	..	0,98	1,48	..	..
Ditto occupied by molars and canine teeth, taken together, ...	..	1,19	1,74	..	..
Ditto ditto molars alone, ...	..	0,78	1,37	..	..
Depth of lower jaw taken in front of carnivorous tooth, ...	..	0,44	0,67	..	0,45
Greatest antero-posterior diameter of canine tooth,	..	0,20	0,38	..	0,13

X.—*Continuation of a Paper (Journal, May, 1835), on the Heights of the Barometer as affected by the Position of the Moon. By the Rev.* R. Everest.

In a comparison of the heights of the Barometer with the position of the moon in declination, (See Journal, May, 1835,) I stated that it appeared, that though the greatest depressions coincided, or nearly so, with the times of the moon's maximum declination, yet that many of the greatest elevations held a similar situation. To ascertain whether this idea was well-founded, the daily barometric heights were taken from the 4 p. m. column of the Meteorological Registers of the Journal; then the differences either in excess or defect from the monthly mean, were noted and placed in different columns according to the state of the moon in declination, as given in the Nautical Almanacks for noon of the same day. Then the average of each column was taken for the year, and continuing the process for the 13 years of which the Meteorological Registers are extant, a general average was finally taken of the whole, which came out as follows:

Moon's Decl.	25°	20°	15°	10°	5°	0°
Average amt. of variation from the monthly mean,	·060	·055	·056	·055	·054	·052

If it be objected that this difference, between the two extremes of the line, of ·008, be small, we may answer that small as it is, it is nearly $\frac{1}{7}$th of the whole amount. The heights of the barometer at London for a period of 24 years were then examined in a similar manner, only that instead of classing the differences in columns according to the number of degrees of the moon's declination on the same day, they were classed according to the distance of the day on which the observation was taken, from the day of maximum declination. Thus, the number of days from maximum north to maximum south declination being nearly 14, the differences were arranged in 14 columns, numbered in this way:

1 2 3 4 5 6 7 8 9 10 11 12 13 14

and as a whole revolution from one time of maximum declination to its succeeding one is something less than 28 days, a column was occasionally left blank to keep the maxima always in the 1st and 14th. This method is rather less troublesome than the former one adopted, but it does not answer so well for a long series of years, as the moon's maximum declination is very different in different years:—for example, in 1820, it was between 28° and 29°, and in 1829, between 18° and 19°. The average, therefore, was taken for the six years in which the declination was greatest, viz. 1818, 1819, 1820, 1821, 1822, 1823. The maximum declination was then always above 25°, so that the first column would correspond with the left-hand column of the former classification. North and south declination were then put together, and the results came out thus:

Days,	1	2	3	4	5	6	7
Average amount of variation from the mean,	·235	·221	·223	·227	·216	·218	·217

The average was next taken for nine years, in which the declination was at a medium, say between 26° and 21°, so that the first column would nearly correspond with the second column of the former classification; the seventh column being, as before, that on which the declination was least. The years were 1814, 1815, 1816, 1817, 1824, 1825, 1826, 1833, 1834, and the results were:

Days	1	2	3	4	5	6	7
Average amount of variation from the mean,	·245	·220	·215	·200	·201	·215	·225

The average was again taken for nine years, in which the declination was least, viz. between 21° and 18°; that is to say, 1810, 1811, 1812, 1813, 1828, 1829, 1830, 1831, 1832. The first column, in this case, would nearly correspond with the third in the classification of the Calcutta barometer. The results were as follows:

Days,	1	2	3	4	5	6	7
Average amount of variation from the mean,	·206	·214	·212	·221	·228	·225	·230

In this last case no increase of variation is perceptible towards the maximum, but then the maximum did not usually exceed 20°, or at the most 21°.

I have as yet said nothing about the perigee, because it has been proved in Europe that the perigee produces some effect on the weather. With a view to ascertain whether the effect produced was the same as that occasioned by the increase of declination, I took the same variations of the London barometer, as before, for 24 years, and arranged them in different columns according to the state of the moon's semi-diameter on the days on which they were taken. The general average came out thus:

☽'s ½ diam.	1000″	990″	980″	970″	960″	950″	940″	930″	920″	910″	900″	890″	
Av. Var. Bar.	·247	·227	·207	·229	·226	·219	·216	·214	·209	·224	·205	·218	·211

Here there appears a tendency to an increase of variation with an increase of semi-diameter; but on examining the differences of the Calcutta barometer, no such increase could be made apparent. It remains, therefore, in doubt whether, in this climate, such an increase does exist—or whether, owing to some mistake, yet undetected, it has not been made apparent. I am inclined to the latter supposition—from this consideration—1st, If no increase exists, no results could be traced from it; 2ndly, If an increase exists, though not, at present, apparent, some remote results would probably be observed, which might be ascribed to it, as their cause.

Thus, with an increase in the variation of the heights of the barometer, an increase both of dryness and moisture would follow. As an increase of variation also attends an increase in declination, it is probable that the greatest effect would be perceived when the two causes were in co-operation together. Now as there are certain years in which the moon's perigee fell on the same day with her maximum declination, either north or south, it is probable that, in those years, the extremes of weather, both of dryness and moisture, would be experienced. Is this then the case? Are those years in which the day of perigee is the same as the day of maximum declination, also those in which the extremes both of drought and moisture occur! By such results let these speculations be tried. For our present purpose, which is only to obtain some useful indications, the difference between an absolute error and a barren verity is not worth mentioning.

XI.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 5th October, 1836.

The Rev. Dr. Mill, Vice-President, in the chair.

Lieutenants Newbold and S. Tickell, proposed at the last meeting, were balloted for, and duly elected Members of the Society.

Mr. Vincent Tregear, proposed at the last meeting, was, upon the favourable report of the Committee of Papers, unanimously elected an honorary member.

Mr. G. F. MacClintock was proposed by Mr. Macnaghten, seconded by Dr. Mill.

The Secretary then read the Report of the Committee of Papers on Mr. C. Brownlow's proposition relative to the publication of the *Alif Leila.*

[See below.]

Resolved—That the Society approve and adopt the Report of the Committee:—that it feels honored by Mr. Brownlow's desire to publish the work under its auspices; and that in addition to its own subscription, the prospectus shall be circulated among individual members, and the patronage of the Government shall be respectfully solicited to Mr. Brownlow's undertaking.

Library.

The following books were presented:—

A Discourse concerning the influence of America on the mind, being the Annual Oration delivered before the American Philosophical Society on the 18th October, 1823, by C. J. Ingersoll, Esq.—*by the Society.*

Notice Historique sur Charles Telfair, Esq. Fondateur et President de la Societé d'Histoire Naturelle de l'ile Maurice, &c. &c.; by M. Julien Des Jardins—*by the Author.*

Nouveaux Choix des Poesies Originales des Troubadours; by M. Raynouard—*by the Author.*

Opinions on various subjects, dedicated to the Industrious Producers; by Wm. Macbere, Esq.—*by the Author.*

The Indian Journal of Medical and Physical Science—*by F. Corbyn, Esq. Editor.*

Gay's Fables translated into Bengali Poetry, by Mahárája Kali Kissen Behadur—*by the Translator.*

Conclusion of the Guldestah, or Nosegay of Pleasure, by Múnshí Mannu' La'l—*by the Author.*

Map of the Indus River and of the neighbouring countries, from the recent surveys, compiled in the Surveyor General's Office—*by Mr. Tassin.*

Royle's Himálayan Botany, 9th part—*from the booksellers.*

Read a letter from the treasurer of the Academy at Bordeaux, Mr. Dutrouilles, forwarding by the hands of Dr. Lavergne a packet of seeds for the Botanic Garden of Calcutta, and requesting in return such seeds from Tibet or other colder parts of India as are likely to thrive in France.

The seeds have been made over to Dr. Wallich, who will kindly reply on the subject to Bordeaux.

Literary and Antiquarian.

An account of some of the Petty States lying north of the Tenasserim Provinces, drawn up from the journals and reports of Dr. Richardson, was submitted by Mr. E. A. Blundell, Commissioner of these new provinces; also a sketch of the history of *Labong*, by the same.

Capt. A. Cunningham, Engineers, A. D. C., presented to the Society the very extensive collection of statues and other specimens of Bauddha sculpture discovered by him in his exploration of the well known monument or tope in the road between Ghazipur and Benares. The following note on these interesting relics was read.

"The stone figures, bas-reliefs, and inscriptions were all found near Sárnáth, a Buddhist monument about eight miles from Benares. The greater number were dug up within a small space of 10 feet square, and nearly all in an upright position side by side. Along with them were 40 or 50 others now lying near Sárnáth, and which were left behind from their being of the same description as those now presented to the Society, and from their being in a less perfect state, and from their wanting inscriptions.

I learned from a villager that when Jagat Singh the Dewan of Cheth Singh, Rája of Benares, was digging near Sárnáth for building materials for the *ganj* which now bears his name, his workmen lighted on a small temple the walls of which they carried away—and it was within that temple that these figures were then seen; but owing to some superstitious feelings on the part of the workmen, no steps were taken at the time for their removal.

The three seated female figures, one bearing an inscription, were found in the ruins of a small temple consisting of only two rooms, and the long bas-relief containing the alligator's heads was discovered in a stone tank 13 feet nine inches square, upon clearing away the rubbish from the pukka terrace which surrounded it.

I am induced to offer these figures to the Society, in the hope that the inscriptions upon their pedestals may be translated, and help to throw some light upon the Buddhist religion, as well as upon Sárnáth and the ruins of the different buildings in its neighbourhood."

The special thanks of the Society were voted to Capt. Cunningham for this valuable contribution to the Museum.

Physical.

The Secretary presented on the part of Mr. Dean, Assoc. Mem., some fine fossil specimens lately obtained by him from the bed or banks of the Jumna river.

Mr. **Dean** had maintained for some time an envoy to explore such parts of the river as he had not been able himself to examine. Out of the produce of this adventure he had selected the specimens now transmitted, because they served to settle the question of the existence of three animals in a fossil state, which had hitherto been doubtful,—or rather which had been for the first time advanced with hesitation from his former collections in the Jumna;—the camel, the buffalo, and the antelope.

They consist of the femur and cranium of the fossil buffalo, about one-sixth larger than the present race;—fragment of the femur of a camel; cores of the horns of an antelope, and waterworn portions of the horn of the axis.

To make the recognition of these fossils as clear as possible, Mr. **Dean** had placed side by side of each the corresponding recent bone, so that no doubt could remain of their identity. The splendid discoveries in the Sivâlik range have meantime removed all uncertainty on the subject, and have even pointed out two distinct species in the fossil camel, on which a paper has just been printed in the Researches.

A paper by Messrs. **Falconer** and **Cautley** was submitted on the *fossil bear* of the Sivâlik range, with drawings pointing out variations from the existing species.

The knowledge of this animal is derived from two fine fragments of the head. The chief peculiarities are observable in the teeth, which are constructed more after the type of the higher carnivora than any other described species of the genus.

A paper entitled "Some remarks on the development of *Pollen*," was submitted by Dr. W. **Griffith**, Mad. Est.

Indications of a new genus of insessorial birds—by Mr. B. H. **Hodgson**.

A Table of the breadth, current, and depth of the river *Satlej*, from *Hari kē patan* to its junction with the Indus at *Mithankot*, was communicated by Capt. C. M. **Wade**.

Also a note on the spring of *Lohand Khár*—by the same officer.

Two large cases containing a fine collection of butterflies, moths and other insects from *Silhet*, was presented by Mr. **George Loch**, C. S.

Observations concerning certain interesting phenomena manifested in individuals born blind, on their restoration to sight, were communicated by Dr. F. H. **Brett**.

Report *of the Committee of Papers on the* Alif Laila.

The Committee having deputed the examination of Major **Macan's** manuscript to those of its Members most eminent for their knowledge of the Arabic language and literature, think it will be more satisfactory to submit the separate minutes of those gentlemen to the Society than to embody them in a general report.

They are unanimous in their opinion of the genuineness, general correctness, and value of the manuscript, as well as in advocating the support of Mr. **Brownlow's** undertaking: and they think the patronage of the Government should also be respectfully solicited. For the correction of the press, they believe Mr. **Brownlow** to have made the best arrangement;—nevertheless, as he has solicited permission to publish the work under the auspices of the Society, it may be proper that a file of the sheets as printed should be furnished to the Secretary to be occasionally submitted to Members of the Committee and other competent judges of their accuracy. They consider the price fixed by Mr. **Brownlow**, 48 Company's rupees, for four royal octavo volumes of 600 pages, to be very moderate, and they trust he will experience the advantage of it in a full list of subscribers.

For the Committee,
J. **Prinsep**, *Secy.*

Minute by Mr. W. H. Macnaghten.

Of the genuineness of Mr. BROWNLOW's manuscript, there cannot, I think, be the slightest doubt. I have compared the third volume of the "Contes Inedits," by M. TREBUTIEN, with the fourth volume of the manuscript, and, as far as I can judge from reading three or four of the commencing and concluding pages, and looking over some of the intermediate pages of each of the six last tales, I believe that they correspond almost exactly.

I have also carefully looked through the third volume of the MSS. The anecdotes which are at the end of the third volume of the French translation, are contained in this volume; but they do not, in the Arabic MSS. appear to be so numerous. They are chiefly introduced between the stories styled ' Histoire d'Adjib et de Gherib," (the last story of the first volume of TREBUTIEN,) and that styled "Des ruses de Dalilah et de la fille Zeinub," (the first story of the second volume of TREBUTIEN.)

I have not had time to compare all the "Anecdotes." They are not entered in the same order as in the French version, owing to which the comparison would necessarily be a work of time—but I have been able to compare the anecdotes styled "Divorce et second mariage de Hind fille de Naaman," page 464, and that styled "Conduite du Vizier Ibn Aamir," page 487, and I find that they minutely correspond with the Arabic MSS.

On comparing the story styled "Histoire d' Abdallah l' habitant de la Mer et d'Abdallah l' habitant de la Terre*," I was much struck with the mutilated state of the story as contained in the French version. I subjoin a version in English of the French and of the Arabic stories. It will be seen at once, how much the former has been shorn of its fair proportions.

Story of Abdallah the inhabitant of the Sea, and of Abdallah the inhabitant of the Land.

There was once a fisherman, called Abdallah, who was father of a numerous family. All his riches consisted in his nets, with which he went every day to the sea shore to supply the wants of his family; he lived in this way from day to day. His wife was confined for the tenth time of a boy: that very day there was nothing at all in their house. The wife told her husband to take his nets, and to throw to the good luck of the new born. The fisherman took his nets, and threw them in with prayers for the happiness of his son. When he drew them out the first time, they were filled with sand, gravel, reeds, and mud, and he did not find even one single fish. It was the same also the second and third time. In vain did the poor fisherman try another place: the night overtook him before he had caught the least thing.

"Great God!" cried he, "is this the luck of my new born! has thou created him that there may be no happiness for him! It cannot be so: he who has opened his lips to form a mouth, has taken care of his existence." Overcome with sadness, he threw his nets upon his shoulders and slowly took the way to his dwelling, thinking what he could say to his starving children and his lying-in wife. He passed before the shop of a baker where he was wont to buy bread. Seduced by the smell of the hot bread, poor Abdallah stopped before the shop, and cast looks of starvation on the bread just brought from the oven. "Do you wish for bread?" asked the baker of him. "I would willingly have some for my poor children," replied the fisherman, "but I have no money to pay for it, for I have not caught a single fish to-day: nevertheless, if you are willing, I will leave my nets in pledge." "How," replied the baker, "could you earn money to pay me, if you leave me your nets in pledge? Hold, here are ten loaves, what you are accustomed to take, and, moreover, ten pieces of money which I lend you. If you are successful in your fishing to-morrow, you will pay me, and if not I will give you credit." "God will reward you," said the fisherman, taking the ten loaves: and he went to the market to buy some vegetables. The next morning he went out very early, and threw his nets all the day without catching any thing. In returning home that evening he did not dare to approach the baker's shop; but the latter having seen him, called him and gave him, as he had done the night before, ten loaves and ten pieces of money. Things went on in this way for forty days, and the fisherman was in despair to see his debts thus increasing without any means of discharging them. The forty-first day he said to his wife, "I am going to tear my nets in pieces; because I see that I ought no longer to reckon on gaining my livelihood in that manner. I am ashamed of being such a burden to the baker, and I must do some other business to pay what I owe." "God is great," replied the wife; "and since he has given us such a generous benefactor, he will grant us also the means of clearing ourselves to him. Do not despair then, continue to throw your nets and put confidence in God." The fisherman followed the advice of his wife; he threw his nets in the name of God, and said, "Be favourable to my fishing, O thou who dispensest the gift of destiny! If I catch a single fish I will carry it to my benefactor." The nets this time were of an extraordinary weight. Abdallah worked with all his strength to bring them to the shore, but the poor fisherman, to his great despair, found nothing but a dead ass, which exhaled a pestilential smell. "There is neither might nor power, but in God," cried Abdallah, in clearing his nets of the carcase. "It is my accursed wife," added he, "who gave me this fine advice; I told her that I was going to give up the business of fisherman, but no, 'God is great; do not despair, continue to throw your nets.' See what it is to follow women's advice! Nevertheless, I am going to tempt fortune again to-day for the last time."

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* Page 89 of Vol. III. of TREBUTIEN.

The fisherman sought another place to avoid the stench of the ass, and threw his nets: they were still heavier this time than the first, and Abdallah found in them a being with a human form. At first he thought it was one of those genii that Solomon had cast into the depth of the sea, after having shut them up in brazen vessels. He, therefore, cried "Pardon! pardon! O Genii of Solomon!" "Fear nothing," replied the figure in the net, "I am a human being like thee; the only difference which exists between us, is that I live in the depth of the sea, and you inhabit the earth." "Then," replied the fisherman, re-assured by these words, "you are neither a genii nor a demon?" "Not more the one than the other," replied the inhabitant of the sea; "I believe in God and his Prophet." "But who threw thee into the waves?" I am, by nature, an inhabitant of the sea, and I serve God. When I was caught in the nets, I was trying to be useful to thee, and I allowed myself to be taken; because it would not have been difficult for me to break your nets, if I had wished to escape; but I recognized the finger of God in this event, and I see that we have both been created to be brothers and friends. The earth produces grapes, melons, peaches and pomegranates: the sea abounds in coral, in pearls, in emeralds, and in rubies. Bring me fruit, and I will fill your basket with the precious stones which are found in the sea." "This proposition suits me marvellously, my brother," said the fisherman; "swear to me that you will keep your promise, and recite the first chapter of the Koran." When the first chapter was recited, the fisherman laid down his nets, and asked his companion his name. "I am called Abdallah of the sea; and thou, what is thy name?" "It is truly extraordinary," said the fisherman; "my name is also Abdallah, and to distinguish us one from the other, I will call myself Abdallah of the land." "Very well," replied Abdallah of the sea; "we have been created one for the other;—wait for me here an instant, I am going to search for something which I wish to make you a present of!" At these words he plunged into the sea to the great grief of the fisherman, who regretted having given him his liberty. "If I had kept him, thought he to himself, I could have shown him for money as a curiosity, and in that manner I might have gained my livelihood."

An instant after the inhabitant of the sea re-appeared, with his hands filled with rubies, pearls, and emeralds. "Do not take it ill," said he to the fisherman, "that I have not brought you more of them; I had nothing to put them in, but I will give you as many to-morrow again, and every day, if you will come here at sunrise." Transported with joy, the fisherman went to the baker's, to whom he gave all his pearls and precious stones, thanking him for all the favors which he had hitherto heaped on him. After that loaded with as much bread as he could carry, and after having bought with the money which the baker had given him, meat, fruit, and vegetables, the good Abdallah ran home to inform his wife of the happy adventure which had happened to him.

"Keep well your secret," said his wife to him; "it is a thing that ought not to be related to every one." "If I must conceal it from every one," replied the fisherman, "I cannot at least make a mystery of it to the baker my benefactor."

The next day, having got up very early, the fisherman went with a basket of fruit to the sea shore, which he reached before sun-rise. He cried there: "Where art thou, Abdallah of the sea?" "What will you?" replied a voice from the depth of the waves; and at the same instant the new friend of the fisherman came out of the sea with a load of emeralds, rubies, and pearls. After having breakfasted together, they retired each going his own way. The fisherman gave, in passing, two more necklaces of pearls to the baker, and carried the rest home. He went afterwards to the bazar, and shewed all the pearls and precious stones to the syndic of the jewellers. "Stop him," cried the latter; "he is the thief who has stolen the queen's pearls!" Abdallah allowed himself to be loaded with bonds, and to be conducted before the king without saying a word. They presented to the queen the pearls which they took for hers, but she declared that the pearls were much handsomer than those which had been stolen from her; that they did not belong to her, and that she would buy them at any price. "Retire, infamous informers," said the king; "as if God could not give riches to the unfortunate also! Retire." When the jewellers had departed, the king turned towards Abdallah: "Now inform me from whence did you get this treasure. I am a king, and I do not possess such precious stones." Then Abdallah related to him his connection with Abdallah of the sea. "Venerable man," said the king, "riches ought to be joined to power;—as long as I reign you need not fear violence; but I would not be answerable that after my death my successor will not cause you to be put to death to seize on your treasures. I wish, therefore, to give you my daughter in marriage and to make you my vizier, so that after me envy may not assail you." After that the king ordered Abdallah to be conducted to the bath, and caused him to be dressed in magnificent clothes. They sent letters for his wife and children, who were loaded with marks of honour. The contract of marriage was drawn up according to all the forms. Abdallah of the land gave as portion to the princess all the treasures which he had received from Abdallah of the sea. The next day the king having observed the vizier betake himself with a basket of fruit on his head to the sea shore, asked him what he meant by so doing. Abdallah replied that he was carrying breakfast to Abdallah of the sea. The answer displeased the king. "This conduct, my son-in-law," said he to Abdallah, "is not suitable for a vizier. Take your choice to remain in the palace, or to drop instantly your load."

Up to this point the French and Arabic versions correspond with great minuteness. The French version, however, terminates in a very abrupt and unsatisfactory manner. It conveys no moral, and leaves Abdallah the inhabitant of the land to enjoy his good fortune, notwithstanding his ingratitude towards his benefactor. The French version proceeds—"Abdallah liking better to preserve his place and the favour of the king, returned no more to the sea shore and lived happily to the end of his days."

The Arabic version is altogether different, and if it possesses no other merit, it has at least the advantage of conveying a moral and teaching a cheerful resignation to the will of Providence: it proceeds thus:—

"Abdallah said, I fear to break the promise which I have made to him. I shall then be accounted a liar, and the world will accuse me of falsehood." The king replied, "You are right. Go, and God be with you." He then went into the city, and the people recognized him. He overheard them saying, "This is the king's relative: he is going to exchange fruits for jewels;" but they who were ignorant and were not acquainted with him said, " O fortunate man, stay a little, and let me form acquaintance with you." He paid no attention, however, to any one, and proceeded onwards till he joined Abdallah of the sea, and presented him with the fruit and exchanged them for jewels. Having so done, he returned to the baker's shop, which he found closed, and learnt that this had been the case for ten days. He then proceeded to consummate his marriage with the daughter of the king, with whom he lived on terms of affection. He went daily to the man of the sea and returned by the baker's shop, but found it always locked. He was at a loss to conceive where the baker had gone, and asked the neighbours where he had gone, and what had happened to him. They told him in reply, that the baker had fallen sick and could not leave his house. Having inquired where his house was situated, Abdallah sought him out. His friend seeing him out of the window bearing a full basket, on his head, descended and opened the door, and throwing himself upon him, embraced him and cried. Upon this, Abdallah said to him, " Where have you been, my friend, this long time; I have come daily to your shop, but have found it shut, and have been unable to find you. Are you in distress?" The baker replied, " No, but I heard that the king had seized you and charged you with being a thief, whereupon I became afraid, and shut up my shop and concealed myself." Abdallah answered, This is true; and then recited his adventures with the jewellers and the king, and how he had married the king's daughter, and had been made his vizier. He further desired him to take as his portion what was in the basket, and not to be afraid. Saying this, he left him in a happy mood, and returned to the king with his basket empty. The king said to him, " O! kinsman, I fancy that you could not have met your friend Abdallah of the sea to-day." He replied, " I did meet with him, but what I obtained from him I gave to my friend the baker, to whom I am under an obligation." The king asked who is this person—to which he replied, he is a baker by profession, and behaved to me in such and such a manner during the period of my distress, and never neglected me. The king asked his name. Abdallah, said he, is called Abdallah the baker—my name is Abdallah of the land, and the name of my companion is Abdallah of the sea. The king rejoined, My name also is Abdallah*, and the servants of God are brothers; send and bring him, we will make him our second vizier. Then were sent for him the vizier and the nobles, who caused him to be clothed in the habiliments of a vizier, and brought him into the presence of the king. He was then made the second vizier, Abdallah continuing the first.

Abdallah of the land, the first vizier of the king, continued after this fashion a whole year, and never omitted for a single day to go with a basket of fruits and to return with a basket of jewels and precious stones, and when fresh fruits were not procurable he used to carry raisins, almonds, walnuts, figs, and such like. Whatever he took was cheerfully accepted, and in return his basket was filled with jewels according to custom. One day it happened that he took a basket of sweetmeats. Abdallah of the sea accepted it, and took his seat upon the land by the sea shore. They entered into conversation and mutually told stories, when the following dialogue occurred. " Is it true, my brother, that the prophet (on whom rest the peace and blessing of God!) is buried among you on dry land, and do you know where he is buried? I do, replied he of the land. In what place? In a city called Yusrub. Do the inhabitants of the land go to visit his tomb? Yes. Happy then, exclaimed Abdallah of the sea, are you denizens of the earth, that you are enabled to visit the tomb of this gracious, clement and merciful prophet who intercedes for all those who perform the pilgrimage! Have you, my brother, ever visited his tomb? No, I was a poor man and had not enough to pay my expenses on the road, but since I became acquainted with you and you have bestowed upon me this exceeding prosperity, it is a duty incumbent upon me to do so. I have a strong desire to visit the holy city, and nothing but the affection I have for you prevents my doing so. I cannot, however, bear to part with you for a single day. Do you, said he of the sea, prefer my friendship to that of the prophet (on whom be the blessing and peace of God), who will plead for you with the Almighty on the day of resurrection? who will save you from the fire, and give you admission into heaven by his mediation? Do you abandon the pilgrimage to the shrine of the Prophet Mahomed, (on whom be peace and blessing of God) through love of the world? To this he of the land replied, "No; I swear that I should prefer the pilgrimage to all things; I only require your permission to perform it this very year." "I have granted you permission," rejoined he of the sea; "but when you arrive at the shrine, submit my salutation. I have an offering to present. Enter with me into the ocean, so that I may take you to my city and admit you to my house—that I may entertain you and entrust to you my offering, in order that you may present it at the shrine of the holy Prophet, saying, This is an offering from Abdallah of the sea, who conveys his salutation, and intreats your intercession to save him from hell fire."

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* Servant of God.

The story proceeds to state that the fears of Abdallah of the land having been removed by the assurances of his companion, and his body having been rubbed over with a certain ointment which gave him the power of living in the water, he entered the ocean with his marine friend. Then follows a long description of the wonders of the deep; Abdallah having seen "wedges of gold, great anchors, heaps of pearl, inestimable stones, unrivalled jewels—all scattered in the bottom of the sea"—and many other things undreamt of even by Clarence. The story concludes thus:—

Having taken leave of the king of the ocean loaded with jewels, Abdallah of the sea took his companion back towards his city. On the road he put into his hand a packet, saying, Take this, and present it as my offering at the shrine of the holy prophet. Abdallah of the land took charge of the packet without knowing what it contained. Abdallah of the sea then proceeded to convey him to the shore, but on the road there appeared an assembly of persons rejoicing and singing, and eating and making merry. Upon witnessing this, Abdallah of the land said to his companion, "For what are these people rejoicing? Is there a marriage among them?" His companion answered, "No—but some one among them has died." "What," said he of the land, "do you eat, drink, and make merry on the occasion of a death?" "To be sure we do," said the inhabitant of the sea: "do not you do the same on land?" "Not we indeed," said his companion; "on such occasions we cry and weep, and the women beat their faces and tear their clothes, and make all sorts of lamentation." On hearing these words, Abdallah of the sea exclaimed, "Deliver up my offering." This he did with fear, and having got upon dry land, Abdallah of the sea said, "I have parted with your friendship—you shall never see me again, nor shall I ever again behold you." "On what account is this?" asked his companion. "It seems then," replied Abdallah of the sea, "that you dwellers upon earth, whose life is a mere deposit by your Creator, cannot endure its being taken back, but you must weep thereat. What then would be the case with my deposit for the Prophet? When a child is born you rejoice that God Almighty has endued it with life as a deposit, but when that is taken away again you feel it as a grievance, and you cry, grieve, and lament. I have no occasion for such company." Saying this he vanished.

Abdallah of the land having put on his clothes and taken his jewels, proceeded to the king, who received him with much joy and gladness, and asked him how he was and what had befallen him. Abdallah then recounted his adventures, and mentioned all the wonders of the deep which he had seen. The king was astonished, but upon hearing what Abdallah of the land had said to him of the sea, the king observed that the former had erred in making the communication which he had done. For a long time afterwards Abdallah continued in the habit of going to the sea shore and calling upon his former companion, but he never re-appeared.

The king and his friend lived happily until the destroyer of delights—the spoiler of all things came, and they both died. Then praise be to God who never dies, who is the living God, Lord of kings and angels, and who has power over all things!

At the conclusion of the tale which immediately precedes the above, and which is styled "Histoire D'Aboukir et D'Aboussir," M. Trebutien's version, is, " Aboussir le fit inhumé et lui eleva un monument sur lequel on grava une inscription *qui renfermait un sens très moral.*" In the Arabic MS. the inscription is given at full length. I here subjoin a translation of the Elegy, which is not without elegance in the original, but which seems rather intended to inculcate the advantage of prudence, and to convey the moral that " honesty is the best policy," than as a suitable epitaph on the tomb of the treacherous friend over whom it was erected. After a series of efforts to ruin his friend and benefactor, the treacherous man came to an untimely and ignominious end, while he whom he designed to ruin, and who buried his corpse (which was found tied up in a bag on the sea shore) attained the summit of prosperity.

" By his deeds a man is known among his equals.
" The qualities of a free-born and noble person resemble his origin.
" He does not revile, though he be reviled;
" For how often what a man says recoils upon himself.
" Abstain from evil words and use them not, whether engaged in serious or trifling matters.
" How many a great man has been subjected to abuse,
" From one whose value is not equal to a fragment of his shoe!
" What is triumphant exultation? even the lion is taken in the toil through ignorance.
" The sea bears on its surface the rotten carcass. But the pearl lies resplendent in its lowermost sands.
" I never saw a sparrow oppose a hawk, but I thought of its insignificance and want of understanding.
" It is written on a lofty pillar in Hindustan, Whoever cultivates virtue shall be recompensed in the like.
" Abstain from the attempt to make sugar of coloquintada;
" For every thing must partake of the nature of its origin."

Scott, in the Preface to his translation of the Arabian Nights Entertainments, has observed, " The stanzas, elegies, and other poetical quotations which so frequently occur in the original, M. Galland has indeed omitted, but such omission (at least in the humble opinion of the Editor) is not to be regretted, for he thinks that to the European reader their insertion would have been an intolerable interruption to the narrative."

M. Trebutien does not seem to have been generally of this opinion, for he has on most occasions faithfully rendered the verse as well as the prose. Where he has not done so, the fault, I suspect, was in the original —not in the translation.

I have compared the MS. of Mr. Brownlow with the printed edition of Habicht and the lithographed work edited in Calcutta, as well as with Scott's and Galland's translations. The comparison was made with one of the old tales, and I took at random the first voyage of Sindbad the Sailor. This examination has afforded additional proof of the genuineness of Mr. Brownlow's MS. M. Habicht's edition comes next to it in fulness and accuracy. The Calcutta edition is very faulty and defective.

I cannot help thinking that an entire and correct translation into English of these beautiful stories is still a desideratum, and that no better original could probably be procured than that belonging to Mr. Brownlow. Scott's, which is the best translation, seems very inaccurate. Take for instance the following passage in the story of Sindbad the Sailor.

Reflecting on the time he had lost and the profligacy of his past life, he says that he called to mind the saying of Solomon, that three things are better than three things: " The day of death than the day of birth—a living dog than a dead lion—the grave than a palace."

This has been translated by Scott, " I remembered the saying of the great Solomon, which I had frequently heard from my father, that death is preferable to poverty."

I leave to other Members of the Committee the task of examining the first two volumes of the MSS.; if indeed any further examination be thought necessary to establish the genuineness of the work. I am quite satisfied as to that point, from the examination which I have made of the third and fourth volumes. The stories of Sindbad the Sailor are introduced at the commencement of the 3rd vol. of the MSS.; consequently it may be assumed that the "*Contes Inedits*" which I have not compared are to be found in the first and second volumes of the MSS. and a comparison of them with the Arabic might be still more satisfactory.

Upon the whole, I have no hesitation in stating my opinion, that the MS. copy of the *Alif Leila* now submitted to the Society is a most valuable addition to the literature of the East, and worthy of every encouragement. I have little doubt that the work would find a ready sale both in Asia and in Europe. I do not believe that Mr. Brownlow requires any pecuniary aid from us. As a Society, we might subscribe for a certain number of copies, and individually I should hope we shall not withhold our aid from this highly public-spirited and meritorious undertaking. To Government, I think, we should make an earnest appeal for support, founded on the credit which must accrue to our nation, from presenting to the Mussulman population of India, in a complete and correct form and in their own classical and beautiful language, these enchanting tales, which even in the estimation of Europe enjoy almost unrivalled celebrity.

Our Maulaví, if competent, might be desired to assist in correcting the press, and I for one should be very happy to aid in this duty, as far as my limited abilities and leisure might permit.

Sept. 20, 1836. W. H. Macnaghten.

Minute by Mr. H. T. Prinsep.

I have examined the four volumes of the *Alif Laila* as far as my time would permit, and am able to confirm entirely the testimony given by Mr. Macnaghten in favor of the accuracy and completeness of the copy. So far as my examination has gone, the tales and anecdotes given in the list at the commencement of the first volume of the "Contes Inedits" are all to be found in the Arabic, and those that have been translated are more full and complete in our copy than in the French version. I did not find the numbering of the nights exactly to correspond. Thus the anecdote of Zobeide in the bath is between the 382nd and 383rd nights, and the secret entrusted to the wife at the end of the 384th; whereas, according to the French list, these ought to have been found first in the 384—385th, and the other in the 387—388th night.

The French version of the "Contes Inedits" is not, it is to be observed, a very close translation; nor does it give in regular order the tales omitted by previous translators. It is still merely a selection, and made not exclusively with reference to merit or the interest of the tales. It is evident, however, that the original must have corresponded very closely with the copy brought to India, by Major Macan, and was probably from the same. Whether it was as complete in all respects, and as carefully made, may well be doubted; for the getting up of this manuscript is of a very superior description. I do not find that the German edition in the original Arabic corresponds exactly in the arrangement of the tales with our copy, but the text does not materially differ of the same tales, which is an additional confirmation of the accuracy and genuineness of the very complete set of these tales now laid before us.

I join heartily in the wish expressed by Mr. Macnaghten, that a complete edition of this work in the original Arabic may be printed in this country from Major Macan's copy, and I doubt not that many subscribers may be found to contribute towards the expense of carrying it through the press, if this should be deemed necessary. The offer of Mr. Macnaghten to correct the press with the aid of the Maulavís of the Persian office, is one that will be appreciated by all who wish well to the literature of the East, and it ought to determine those who hitherto have felt hesitation at the idea of attempting so great a work.

I am afraid that no capable person has leisure here in India to undertake the translation of these four volumes into English. But certainly it would tend equally to the credit of our literature were it possible to put this also in hand. Were I myself an idle man, I should like no better amusement than to take up such an occupation.

Sept. 25, 1836. H. T. Prinsep.

Minute by the Rev. Dr. Mill.

I entirely agree with Mr. Macnaghten and Mr. H. T. Prinsep as to the undoubted genuineness of Mr. Brownlow's MS. The style of these tales is very strongly impressed on the memory of every one who has read any large portion of them in the original: and on comparing the detached portions I have read from this MS. during the three days it has been with me, with the recollections of the Voyages of Sindbad which I have repeatedly perused from M. Langl'es' edition (Paris, 12mo. 1814)—there is the same delightful ease and simplicity of style, with the total absence of the rhetorical effort so general in other works of imagination in the same language,—the same purity of Arabic idiom, with the free introduction of foreign nouns, which (even independently of the external evidence) bears witness to the common origin of all. This MS. is apparently much closer in its order and readings to Baron Von Hammer's Cairo MS. (bought at Constantinople) from which M. Trebutien's "Contes Inedits" are published, than to the Tunis MS. from which M. Habicht's complete edition of the original is now publishing at Breslau: and for this reason, amongst others, I do not think that work need preclude the publication of this.

e. g. the Persian *Sharáb-khánah* and our own well known *Mosál-jée* (an Arabic participle with a Turkish termination) which I observe in Night 284, vol. 2, of this MS.

The part which I have taken almost at hazard for critical examination, is the part shortly preceding that which has been so ably examined by Mr. Macnaghten. It is the curious adventure (near the beginning of the 2nd volume) of Isaac of Mousul the musician, and the consequent introduction of the Khaliph Mámún to his future bride, the daughter of his Vizier Hasan ben Sehl. This occupies from the middle of Night 277 to 280 in the MS., but from 279 to 282 in Trebutien, (this slight difference arising rather from a different division than from any deficiency in this MS. as the collation of the preceding tales shews.) A comparison of this story with the same in Trebutien's third vol. (p. 289—295,) has convinced me that the text of Macan's and Hammer's MSS. is as nearly identical as those of any two ordinary MSS. of an oriental work, and that whatever discrepancies appear between the Arabic and the French in this part at least, arise from the translator rather than from his text. An example or two will best prove this.

MS. (literally translated.)	*Trebutien.*
There appeared something hanging from the adjoining houses, and lo! a large basket decked with silk at the four handles. I said to myself, "Surely there is a cause for this," and I remained amazed at my adventure. But intoxication	Je regardai ce que ce pouvait être, et, à ma grande surprise je vis une sorte de corbeille garnie de soie. Comme le vin que j'avais bu dans la soirée m'avait un peu troublé le cerveau, je me plaçai dans cette corbeille

so far transported me, that my mind said to me, "Sit down in it." Accordingly I sat down, and when those who let down the basket to me felt I was within, they drew it up to the top of the wall: and behold four damsels who said, "Alight freely and without restraint." And one of them walked before me with a taper till I entered into a house: and there were sitting rooms strewed out such as I had never seen even* in the Khaliph's palace.	sans savoir ce que je faisais, et au même instant je me sentis enlever en haut.. Je fus reçu sur la terrasse par quatre belles esclaves qui m'engagèrent à descendre dans la maison. L'une d'elles marcha devant moi, un flambeau à la main, et me conduisit dans une salle, dont la magnificence ne pouvait être comparée qu'à celle des appartemens du palais du Khalife.

To the method so apparent in the above extract, of seizing only the points of the *narrative*, and neglecting the orientalisms of style and manner by which they are introduced, I should ascribe even the places where the two copies appear discordant; as, where in Trebutien (after the long interview with the lady described in substance exactly as in the MS.) Isaac is made to go down by the basket as he came:—"On me descendit dans la corbeille;" whereas the Arabic MS. distinctly says in that place, "A damsel went down stairs with me and opened [the door] to me, and I went out and walked to my house." (Night 279): where it seems to me at least as probable that the translator hastening with the story after his manner, left out the circumstances of descent and added "dans la corbeille" afterwards, on revising his French, than that he found the basket in his original. The conclusion of the story furnishes another striking example of his manner, and of the disadvantage which these tales suffer by being so translated.

MS. (literally.)	*Trebutien.*
Then we went out: and he said, "O, Ishak, do not tell this story to any one;" so I concealed it till the death of Mámún. Never had any one an interview such as I had during these four days, sitting in the day with Mámún and in the night conversing with Khadijá. By Allah I never saw any one of men like Mamún, and never did I behold a woman like Khadijá, who even approached her in wit and understanding and eloquence. But God knows best.	Nous sortîmes de la maison, Le Khalife m' ordonna de ne pas parler de ce qui venait de se passer; et j'en ai gardé le secret jusqu'a sa mort. Ces trois nuits, dit Ishak de Mossoul, je les mettrai toujours au rang des plus agréables que j'aie jamais passées dans la plus aimable société.

Similar conclusions were obtained by comparing the preceding story in the 2nd volume of the MS.—the adventure of Abdallah the son of Abu-Kolába, and his discovery of the paradisiacal city of Sheddad the son of Ad—occupying from p. 284—289 of *Trebutien* (who calls him Abdallah, son of Kotaiba, and with whom his *nákah* or she-camel is a mule). The text of the two Egyptian MSS. of M. Trebutien and Major Macan must be almost entirely the same.

Very different, however, is the text of Professor Habicht's edition, which, if it contains either of the above "Anecdotes" of M. Trebutien, must place them in a very different place from that in which the numbers led me to search for them without success. And this is not wonderful, as the arrangement of the nights is altogether different in the two editions. For example, the Voyages of Sindbad in *both* the Egyptian MSS. (MS. vol. 3, and Trebutien, Preface p. xlvi.) occupy night 536—565, but in the Tunis MS., Night 250—271, as appears in Habicht's 3rd and 4th volumes.

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* The discrepancy from the French may here very probably arise from the omission of the word إلّا by the copyist—but the mistake may just as probably lie on the other side.

On the other hand, the first of the unpublished Tales in both the Egyptian MSS.—where it occupies from Night 34—38 (MS. vol. 1 and Treb. p. xli.) occupies all from the 139th to the 218th in HABICHT (iii. 66—166). It is not, however, actually longer in the latter than in the former: and as this tale, viz. the History of the two Viziers of Mohammed Ibin Soleman Alzíní [in HABICHT "Alrasi"] has never been translated either by GALLAND or TREBUTIEN, I selected it for the collation of the two Arabic texts. Here, though I found the printed and MS. text to tally in the main from beginning to end, not only as to the succession of incidents, but in the poetical passages interspersed throughout, the variations were very considerable both in the prose and the verse: whole clauses appeared in the one which were not in the other; the advantage of fullness being sometimes on the side of Mr. BROWNLOW's MS., but more frequently on that of the Breslau edition.

On the whole, I should strongly recommend the publication of this text without any reference to that of M. HABICHT—even in the parts which might be compared with advantage. (Mr. MACNAGHTEN's offer of assisting in the correction of the press is one which should be most thankfully embraced, however learned may be the Maulavi engaged for the purpose.) When *both* texts shall have been published, (belonging, as they do, apparently to two very different editions or recensions of these celebrated tales, one long current in Egypt and Arabia, the other among the Maghrebín Arabs of Barbary and Spain,) they may enable the critics of Europe to form perhaps a judgment as to the true original text of both. The work of a translator is one of greater difficulty: and we have none probably in India, possessed at the same time of ability and leisure for a work of this description. The ease and vivacity of M. GALLAND's translation, so deservedly popular among Western readers, would be a good model for imitation—avoiding, however, his liberties with his original, except, indeed, in the too frequent cases where decency requires curtailment or omission. M. TREBUTIEN is far more faithful in giving the whole of his original: but in the mode of representing it, a due medium between his too occidental style of paraphrase, and a servilely literal version of the Arabic text, would be, in my opinion, at the same time more accurate and more pleasing.

W. H. MILL.

Minute by Mr. J. R. Colvin.

I have no pretensions to the name of an Arabic scholar, and shall not presume to offer any opinion of my own on the genuineness of these volumes. But I can bear testimony to the late Major MACAN's opinion of their genuineness. He was a highly competent judge; and had made inquiries which satisfied him on the point before he bought the manuscripts in England.

I cordially join in the wish to give encouragement to the publication of a complete edition. J. R. COLVIN.

Minute by Mr. C. E. Trevelyan.

Neither have I the least pretension to be called an Arabic scholar, but it is not necessary to be one in order to appreciate in some degree the beauty of the Arabian Nights. I think it very desirable that a correct version of the original Arabic should be published, and still more so that it should be well translated into English. Such a translation, if it were well executed, would be a most valuable accession to English literature, and I believe that for one person who would read the book in Arabic, five hundred would read it in English. Nobody, in my opinion, is so eminently qualified for this task as Mr. MACNAGHTEN, and if he could be persuaded to undertake it, he would lay every person who reads English under an obligation to him. C. E. TREVELYAN.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of September, 1836.

Day of the Month.	Observations at 10 A. M.							Calculated Humidity.			Observations at 4 P. M.							Calculated Humidity.			Register Thermometer Extremes.		Rain.	Wind.		Weather.	
	New Stand. Barometer red. to 32°.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew point.	Hair Hygrometer.	Centesimal tens. of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.	New Standard Barometer.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew-point.	Hair Hygrometer.	Centesimal tension of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.	Cold on roof.	Heat in sun.		10 A. M.	4 P. M.	Morning.	Evening.
1	29,549	29,603	85,7	5,0	4,2	78,3	91	79	80	80	29,407	29,471	[illegible]	7,3	5,6	77,0	88	71	69	74	76,0	108,0		S. E.	S. E.	cum. strat.	cloudy.
2	,516	,544	86,1	5,4	4,8	78,3	90	78	78	73											76,2	110,0	0,25	E.		cumuli.	
3	,518	,555	86,7	5,6	5,0	79,0	89	77	78	76	,400	,459	87,8	5,9	5,9	79,0	88	76	76	74	76,0	105,3		o.	se.	do	cum. fine.
4	,517	,560	86,1	5,4	5,0	78,0	89	76	77	76	,375	,431	87,7	6,2	5,0	77,5	90	72	72	78	76,5	104,0		ne.	n.	do	showery.
5	,470	,520	86,1	4,5	4,2		93	81		84	,403	,460	85,3	4,5	3,5	76,7	95	80	76	88	76,6	99,3	0,10	S. E.	S. E.	do	do. calm.
6	,579	,625	84,9	3,9	3,4	79,0	94	83	83	86	,477	,521	82,8	3,4	3,4	73,5	95	85	87	88	76,4	81,0	0,05	S. E.	S. E.	showery.	do
7	,632	,680	84,2	2,7	2,6	79,0	95	88	85	88	,535	,581	84,3	4,6	3,6	76,9	96	80	79	90	75,2	91,6	2,35	S. E.	S. E	do	do
8	,677	,705	79,4	2,5	2,5	75,3	95	87	86	88	,575	,635	81,7	2,2	2,7	77,5	95	90	88	8[illegible]	73,5	104,8	,90	W.	w.	overcast.	rain all day.
9	,758	,798	83,5	4,1	3,0	74,0	93	82	87	84	,596	,696	85,1	4,5	3,7	77,0	92	81	85	82	76,7	88,8	,65	W.	S. W.	fine.	cloudy.
10	,754	,804	81,5	2,2	2,2	78,0	96	90	90	90	,592	,693	85,5	5,2	3,6	77,5	91	77	85	69	73,8	91,0	,10	S. W.	S. W.	contl. rain.	overcast.
11	,694	,727	83,6	4,4	3,2	77,0	94	81	87	86	,572	,625	88,2	7,0	5,1	77,5	88	70	71	74	77,1	103,0	,70	s. w.	sw.	cum. cirrus.	fine.
12	,711	,758	74,1	1,5	2,0	76,0	96	92	44	90	,600	,640	82,[illegible]	3,6	2,2	77,7	95	82	87	88	72,0	104,0	,40	o.	sw.	contl. rain.	showery.
13	,700	,742	85,3	5,6	4,5	75,0	89	75	72	76	,546	,637	90,3	12,0	12,0	72,8	76	53	53	52	74,2	107,9		o.	nw.	overcast.	fine.
14	,702	,739	85,0	9,2	8,0	71,2	82	58	65	63	,584	,63[illegible]	91,1	13,4		69,2	74	50	53	49	76,2	109,5		N.	n.	clear.	clear.
15	,699	,734	85,3	8,0		71,4	84	63	64	66	,572	,620	90,9	13,5		72,4	73	49	56	47	75,0	115,0		N. W.	nw.	do	fine.
16	,655	,701	86,2	8,2	8,0	72,4	86	66	61	70	,547	,586	88,8	9,2	10,0	71,5	61	62	53	61	78,4	111,0		S. W.	W.	cum. strat.	dull.
17	,636	,696	87,2	7,6	7,3	73,0	85	66	64	63	,505	,561	91,9	14,0	11,7	71,4	73	36	52	47	77,0	122,0		nw.	nw.	overcast.	cumuli.
18	,626	,662	85,7	6,4	6,2	75,2	86	72	72	70	,520	,572	91,7	12,7	12,1	72,5	[illegible]	54	54	53	77,0	110,7		nw.	nw.	fine.	do
19	,646	,687	86,6	6,9	5,7	74,0	89	75	68	76	,536	,584	89,5	8,5	8,3	74,4	84	66	63	66	79,0	105,8		w.	sw.	do	do. fine.
20	,645	,689	87,3	5,6	5,4	75,2	90	76	68	78	,562	,605	84,9	4,9	4,3	77,0	92	78	73	82	80,0	9[illegible],0	1,50	se.	S. E.	cumuli.	overcast.
21	,674	,713	86,5	4,9	4,6	75,6		71	71		,553	,615	92,3	10,7	8,1	75,5		60	60		82,2	111,0		S. W.	S. W.	fine.	fine.
22	,708	,756	87,9	7,1	6,6	73,5		71	68		,590	,654	92,3	11,0	11,6	72,0		59	53		77,9	102,1		S. W.	S. E.	clear.	cir. cumuli.
23	,702	,751	88,3	6,0	6,6	75,0		76	66		,570	,630	93,2	11,0	11,2	72,8		60	52		77,2	115,8		N. W.	N. E.	cumuli.	cir. fine.
24	,631	,694	88,7	6,7	7,0			73			,479	,546	91,7	11,0	9,7	71,3		59	73		77,0	114,8	0,30	ne.	nw.	do. fine.	showery.
25	,601	,643	86,9	10,4	10,6	71,5		59	61		,506	,572	91,7	14,4	13,1	71,0		49	52		70,0	112,7		N.	N.	clear.	clear.
26	,654	,706	87,7	9,2	8,9	72,0		64	60		,593	,644	86,3	8,1	7,6	73,5		61	67		78,0	110,6		n.	N	fine.	hazy.
27	,641	[illegible]	[illegible]	7,8	7,4	73,5		69	63		,539	[illegible]	89,8	11,1	5,5	77,3		51	63		74,5	95,2	1,50	N.	N. E.	cumuli.	hard rain.
28	,631	,670	84,9	3,9	3,6	78,3		83	80		,519	,562	83,1	4,8	4,3	75,0		77	77		72,3	83,0	,60	N. E.	E.	hazy.	cloudy.
29	,527	,556	79,6	2,6	2,2	76,8		88	90		,405	,435	79,7	2,2	1,9	76,8		89	90		72,0	81,0	5,05	N. E.	N. E	incessant rain	storm.
30	,565	,592	80,2	5,4	5,0			75			,498	,531	85,1	6,4	6,[illegible]	76,6		61	75		73,2	85,2		sw	S. E.	cldy. gale.	nimbi.
Mean.	29,634	29,676	85,1	5,5	5,1	75.5		75,0	75,0		29,523	29,581	87,7	8,0	6,8	74,9		68,4	68,2		7[illegible],9	103,2	14,45	change.		close of rains.	

The new Barometer lower than the old .042 at 10 A. M. and .058 at 4 P. M. respectively. The hair hygrometer was applied to other experiments from the 21st for 'Calculated humidity.' See observations of last month.

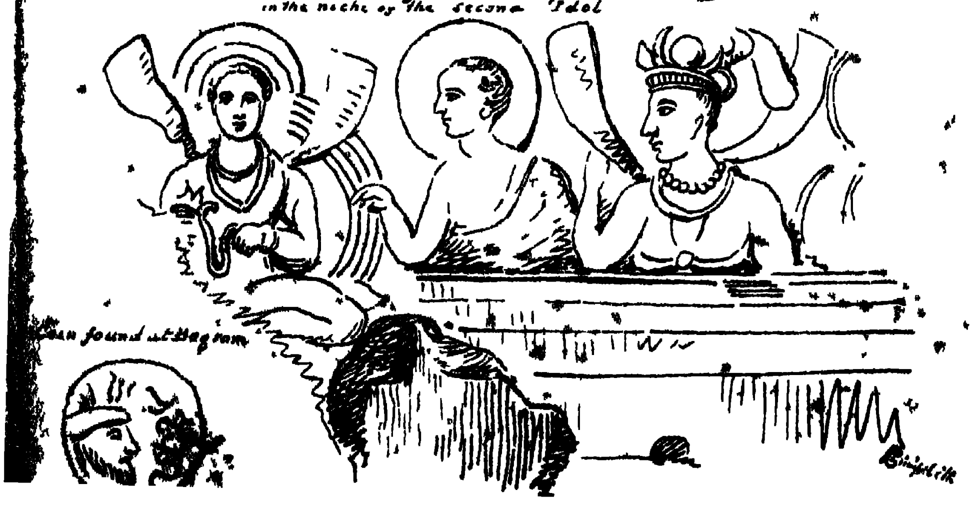
Names of places in Dr Richardson's 3 tours in the Tenasserim provinces.

1 [illegible] 3 လဘုန် 4 လကွန် 5 တာရင်[illegible] 6 သံလွင် 7 မုံပယ်
8 [illegible] 9 [illegible] 10 [illegible]ကျ: 11 မြိန်မော် 12 ဇလိုင် 13 ဂျမ်ယာ 14 ဂယော်လမြိုင်
15 ရင်ပိုင် 16 မရုခြင်း 17 ရေတခွန် 18 ဧပြင်ကကက် 19 ဝင်ဗိုး 20 သောင်ရင်း
21 ကြိုင် 22 [illegible]ကြိုင် 23 ဂသာင့်ရင် 24 မှိုင်းလုံကြီး 25 သံလွင် 26 မယ်သာဝေ
27 ဆင်ရွှေပေါ 28 မဲ[illegible] 29 သစ်စည်း 29 ဂျုညာ. 30 ရေမွေ: 31 ဘန်တာ 32 ကာပါ:
33 ဘုန်ကြီး: 34 လဘုမ် 35 မဲဂကောနိး 36 မဲလိုင် 37 တွတ်တပေါ် 38 ရောင်ဒိုယ်
39 ဃဟ 40 ဇဘုရ 41 မဲပိန် 42 43 44 မှိုင်ဝိတ် 45 မဲနံမ 46 47 တဲ
48 49 နောင်လုံ 50 51 52 မဲတာ 53 54 55 သံလျင် 56 ကောင်ပိ
57 58 59 60 မဲငွတ် 61 မုတ္တမ 62 63 64 မှိုင်တိုင်
65 မဲကွန် 66 ကာဒု 67 ဂကောင်မြို့ 68 မိတ် 69 70 ဆင်ရွှေယ် 71 မဲသာဝေ
72 သောင်ရင်း 73 ဝင်းဝိ 74 ရေတခွန် 75 ရင်းပိုင် 76 ဒါးကြိုင် 77 မရုမ်ဂခြင်း
78 လှိုင်ဘွယ် 79 ကျွဲဂခြင်း 80 ဒုန်ရိ 81 လဝတလိုင် 82 ကြိုင် 83 သံပန်
84 အစုန်ဂခြင်း 85 ဓမ္မသ 86 နောင်လုံ 87 ဂုံခေါင်းမြဲ 88 ယွန်ဒလင်း 89 ရွေ
ကျည် 90 တောင်ရိုး 91 ဒုတာပြင် 92 ပါသင် 93 တဲ 94 တော်အား 95 ရောဗဒလွင်
96 ကြိုင်းသင် 97 ကြိုင်းတုံ 98 မိနိုးဂညာင်း 99 ဗရပ် 100 ဆရာတော် 101 ကျွဲသား
102 ဝိတမုရိ ~ လင်းဒင်း 103 အုန်ပြည် 104 ပျာသဒိပ် 105 106 ကရင်နီ
107 လကွန် 108 ဗန်ဘုန် 109 ဗန်တိုဒိ 110 ဒုံမိတလွှ 111 ကြေးစည် 112 တိုး
113 ဂဏ်ဘံမယ် (The blanks are so in the original)

J P litho

Mr Masson's Sketch of the sculpture at Bamián.

in the niche of the second Idol



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JOURNAL
OF
THE ASIATIC SOCIETY.

No. 58.—October, 1836.

I.—*An account of some of the Petty States lying north of the Tenasserim*[1] *Provinces; drawn up from the Journals and Reports of* D. Richardson, *Esq., Surgeon to the Commissioner of the Tenasserim Provinces. By* E. A. Blundell, *Esq. Commissioner.*

[The small figures refer to the accompanying Plate, where the native words are correctly written in the Burman character.]

Of the numerous petty states north of the *Tenasserim* provinces, those only of *Zimmay*[2], *Labong*[3] and *Lagon*[4], on the east bank of the *Salween* and the slip of country on the west bank inhabited by a wild, barbarous, but independent tribe of mountaineers called Red Kayens[5], have hitherto been visited by Europeans. Of the vast extent of country between the *Salween*[6] and *Cambodia* rivers, we know little or nothing, though it is hoped the expected opening of an overland trade between the frontiers of *China* and the *Tenasserim* provinces will extend our knowledge of the intermediate country.

The town of *Zimmay* (or *Changmai*) is situated in Lat. 20 N. and Long. about 99 E. That of *Labong* is distant from *Zimmay* only 10 miles S. E.; *Lagon* about 50 S. E. from the same. The several states are named after these towns, but their respective boundaries are not well defined, and, together with those of *Moung-pay*[7] and *Moung-nam*, appear to be the patrimony of one family. About fifty years ago, when the whole of this country was under the dominion of *Ava*[9], seven brothers succeeded, with the assistance of *Siam*[10], in throwing off the Burmese yoke, ejected them from the above named towns, and having been confirmed in the government of them by *Siam*, have continued tributary to that kingdom, and successfully resisted all the attempts of *Ava* to regain possession. The elder brother was invested with the title of Chow-tchee-Weet, or "Lord

Life," with the supreme authority over the others, and the title has descended to each brother successively alive till it reached the youngest, whom Dr. Richardson found on his first and second visits, but who died at the advanced age of 73 years, during his third visit. It is now in abeyance in the family, and awaits the decision of the court of *Siam*.

Of the original inhabitants of this country but a very small portion now obtains,—perhaps not above one-third of the whole, owing to the great number that were carried off by the kings of *Ava* when they overran and subjected the country. The remainder consists chiefly of Burmese[11], Peguers[12] and Shans[13], from the different states tributary to *Ava;* either refugees or slaves; for slavery exists in this country in its worst features. The unfortunate wretches are kidnapped and seized by the hill tribes on the west bank of the *Salween*, of whom some account will be given, and eagerly purchased from them at very low rates, by the people of this country. Dr. Richardson was unable to form an opinion as to the amount of the population. He was told that the towns of *Zimmay, Lagon, Moung-pay* and *Moung-nam* contain each about 20,000 and *Labong* 14,000, but he thinks these numbers exaggerated.

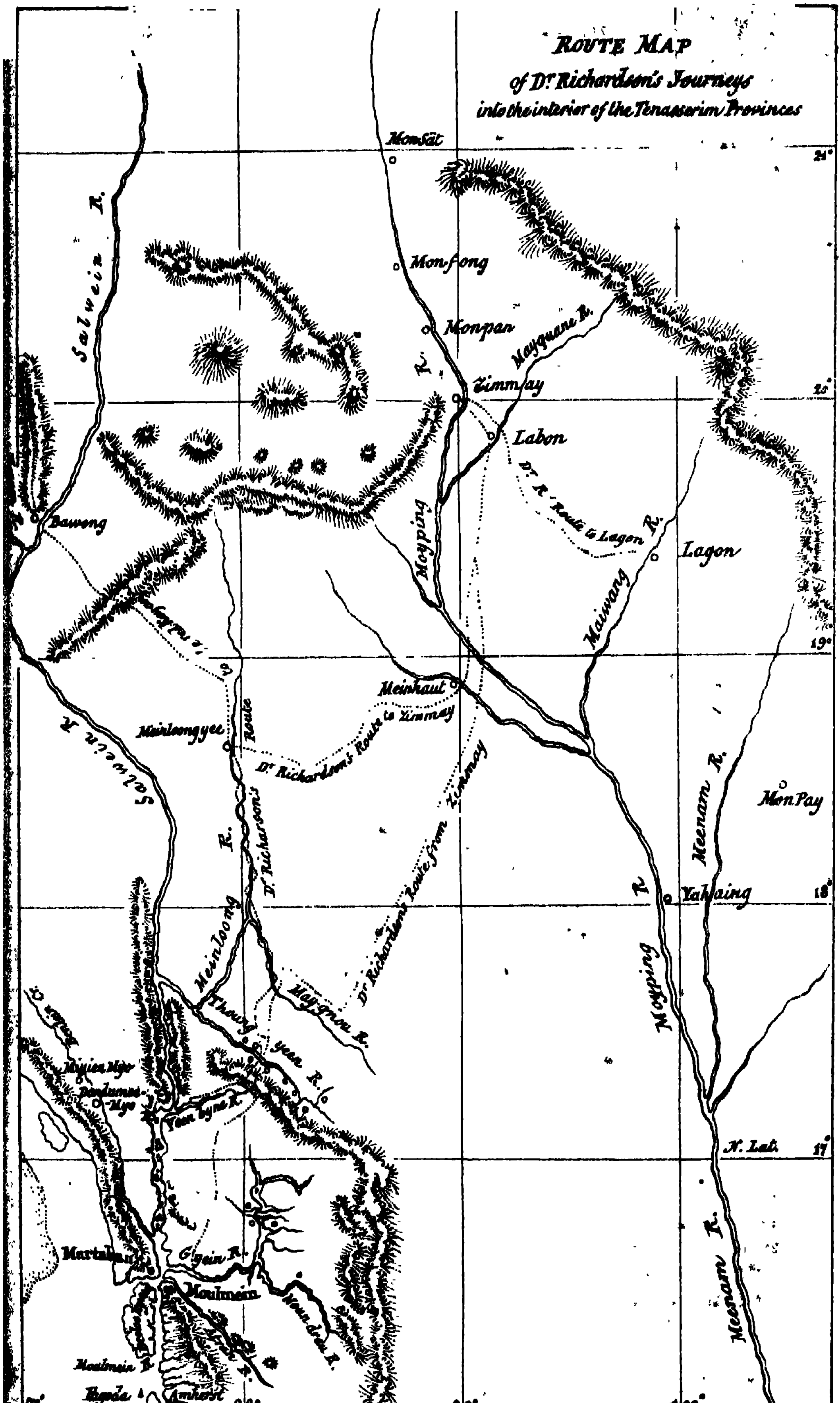
In person the Shans bear a great resemblance to their Burmese and Siamese neighbours, though somewhat fairer. They are muscular, well formed, and healthy in their appearance: eyes moderately linear; nose small rather than flat; the mouth large, and disfigured by black teeth and gums, which they cherish as a beauty; the hair is long, straight, lank, and almost always black. They tatoo the lower limbs, but to less extent than the Burmese. Their dress consists of a cotton *putso* or cloth round the loins, generally blue, a blue cotton jacket reaching well over the hips, and a coarse red cotton turban; though many go uncovered. The dress of the chiefs is of the same description, but the materials are more costly,—Chinese crape or satin jackets, with gold or silver lace, the *putso* of silk. The women are fair and good-looking, and their dress more becoming than that of Burmese or Siamese,—not open in front as with the former, nor tucked up between the legs as with the latter. It is, however, fastened in the same way round the body without pin or string. Old and young have the bosoms bare, or but partially covered by a small scarf thrown round the shoulders. Many of the women are disfigured with goitre, but it seldom attains a large size. The people are a quiet, mild, good-humoured race, and not addicted to many vices. Opium smoking and gambling are scarcely known, and drunkenness is uncommon. The religion is that of Buddh, and consequently their ceremonies and festivals differ in no material manner from those of the Burmese, which are now well known: indeed there is little other difference between the two races than that of dress and language; which latter is a dialect of the Siamese with a distinct alphabet, bearing in the formation of the letters a great resemblance to the Burmese character. Of the resources of a country so thinly populated and so constantly subjugated to the devastating inroads of both Siamese and Burmese, according as one or the other of these powers held the sovereignty, it is not practicable to form an estimate. Speaking of the soil and cultivation, Dr. RICHARDSON says—"The soil in the low paddy and garden lands is a rich black loam apparently inexhaustible, in which the crops follow each other in uninterrupted succession. Cultivation is conducted with a good deal of care by irrigation and transplanting, and the return on good lands is about 120 and on inferior about 75 fold. The general seed-time is in July and August, and the harvest in December and January, though some descriptions of paddy are perfected in three months. Their plough closely resembles those used in the south of Scotland without the culture or ploughshare, and is often drawn by one buffalo. The principal articles of cultivation are the cauth-brier, or glutinous rice, cotton, maize, sugar-cane, tobacco, ground nut, chillies, several kinds of pulse, radishes, and turnips. Of grain, wheat, and other corn they have none. Pepper, cloves, and all the finer species of spices are unknown." Both the soil and climate seem well suited to the cultivation of Pernambuco cotton, which is now being introduced into the Tenasserim provinces; and it is much to be regretted that the seed with which Dr. RICHARDSON was furnished on his last visit proved bad, as the people evinced great desire to cultivate so valuable an article. If the cultivation of South American cotton is found to answer in the Tenasserim provinces, of which great hopes are entertained, every exertion will be made to introduce it into the neighbouring countries.

Tin, iron, and lead ores appear to be abundant in the country, and some of them very rich, though it does not appear that the extraction of the metal is engaged in to any extent. Dr. R. was informed that the tin ore yields 80 per cent., and some iron ore that was shown him seemed equally rich. There are extensive teak forests in that part of the country immediately adjoining our provinces, but owing to the difficulty of bringing the timber down the *Sulween* river in consequence of rocks and rapids, it is doubtful whether we shall be enabled to avail ourselves of that supply to any extent. The country abounds in cattle, to procure which originally, and subsequently to ensure the supply, has been the object of Dr. R.'s several visits. An immense saving has been effected to Government in obtaining from thence sufficient cattle for provisioning the European troops on the coast, in lieu of procuring them from either Bengal or Madras.

The trade of the country is unimportant. An annual caravan visits it from the frontier provinces of China, bringing silks, satins, velvet and woollens, (the latter chiefly English,) cooking vessels, musk, and trifling articles of Chinese manufacture; and carrying away chiefly raw cotton, the produce of the country. It is expected that a portion of this caravan will this year extend their journey to *Maulamyne*[14], and hopes are entertained that this will lead to annual visits in increasing numbers, and the opening of an important overland trade between China and our possessions on the Tenasserim coast. From *Maulamyne* are received British piece goods, chintzes, muslins, hardware, &c. in return for cattle, ivory, and a small quantity of stick-lack. With the hill tribe on the west bank of the *Salween* they exchange cattle, grain and betelnut (the latter from *Maulamyne* and *Bankok*), for slaves, tin, lead, and stick-lac.

It is evident from all that Dr. R. observed and reports, that both the chiefs and people of this country are not only desirous of continuing on the most friendly and intimate footing with us, but that they are really grateful for the immense benefit which our presence in their neighbourhood has conferred upon their country; and there is no doubt that should any future danger menace them, they would gladly place themselves under our protection, and see their country under our rule. Our occupation of the provinces has spread peace and happiness over a wide extent of country entirely independent of our authority, by putting an end to that ruthless and devastating system of warfare that had been for ages carried on between the Burmese and Siamese, whose object was not conquest, but solely to plunder and to carry off the defenceless people into irremediable slavery. On many occasions, as Dr. R. passed through the country, the common people and cultivators expressed to him how different was now their state to what it was in former years, when they scarce dared leave the walls of their towns to cultivate their lands; were obliged to be armed and constantly on the alert, and to leave their wives and families in the town; whereas now the country is in every respect equally secure, and they are enabled to follow their avocations without apprehensions of any kind.

The fact may be observed here, that our occupation of the Tenasserim provinces has also proved of incalculable benefit to a large portion of the population of Burmah themselves, as it is well known that the



Oriental Lith. Press, Calcutta.

authorities in that country in our immediate neighbourhood,—Rangoon for instance,—have found themselves obliged to modify their exactions and oppressions, and to govern in a better spirit of justice and humanity, being well aware that the people have a refuge to fly to should they be driven to desperation.

The following extracts from Dr. Richardson's Journal will show the route travelled by him, and give an account of his reception by the chiefs whom he visited.

Dr. R. left *Maulamyne* on 11th December, 1829, and proceeded in boats up the Salween river for about 100 miles, and landed on the 14th on the east bank at the junction of a small stream called the *Yembyne*[15]. From hence he started on the 16th.

Journal.

" 16*th*. Direction North, 70 East. Time, 3 hours; distance, 7 miles, 4 furlongs.

" 8. 30. Proceeded along a good path practicable for bullocks, elephants, &c.

" 9. 35. At the bottom of a short and rather deep descent crossed the *Yembyne* river, about 70 feet broad, running South, 45 East.—11. 40. Halted for the night on the banks of a small grassy lake: the path has been good and gently ascending; the jungle of bamboos and common jungle trees, thick and impenetrable, owing to the creepers; the march, though only seven miles, was made with difficulty, owing to the thickness of the jungle.

" 17*th*. Direction North, 80 East. Time, 3 hours; distance, 8 miles.

" 7. 30. Proceeded for some way along a path of the same character as yesterday.

" 8. 15. Along a swampy path at the foot of a nearly perpendicular rock, but covered with verdure to the top.—8. 35. Another rock like the former, (called by the Careens *Lein Koso*;) path better.—8. 45. Crossed a small stream with steep banks at the site of a village deserted last year by the Careens (who remove annually to a new position). It is now overgrown with tall jungle.

" 9. 30. Crossed the *Yembyne* river, wide 30, deep 3 or four feet; clear, rocky bed, swarming with fish. Halt for an hour.—10, 30. Path soft, along a valley winding amongst the hills with long grass and dwarf bamboos, much intersected by tracks of elephants, rhinoceros, and wild hog.

" 10. 10. Again crossed the *Yembyne* river, wide 40 feet; course South, 20 East.

" 11. 30. Halted on the eastern bank (course S., 65 East), where it is joined by a small stream called the *Mean Keun*[16], running S. 50° west; the path nearly as yesterday; continued to ascend. Here we were joined by the Careens from the second villages, and dismissed those who accompanied us the last two marches.

" 18*th*. Course North, 80 East; distance, 10 miles 4 furlongs.

" 7. 30. Crossed the *Mean Keun* four times in 20 minutes, and proceeded along a rocky path through thick jungle.—8. 20. Crossed *Yea-ta-goon Keun*[17] 20 feet wide; clear rocky bed.

" 9. Came again to the banks of the *Yembyne* river.

" 9. 10. Crossed a small stream falling into the last.

" 9. 30. Path soft through long grass surrounded by hills.

" 9. 40. Along the rocky bed of the *Yea-ta-goon-keun*, (waterfall stream.)

" 10. 30. Halted for half an hour.—11. Ascended with some difficulty the face of a broken rock 3 or 400 feet in height, over which the water of the *Yea-ta-goon* during the rains falls.—11. 30. Halted at the top of the waterfall, within sound of another which we heard tumbling from the hills above us to the eastward. The path to-day continued ascending and very bad, either soft with long grass, or rocky and uneven and extremely tortuous; but the Careens say it is the only pass through this part of the hills; that elephants, horses and bullocks formerly travelled it with loads, and that it was the route of the Burman army in 1790. Passed some of the large bamboos peculiar to this country, some catechu, and some of the tree with the sap of which the Careens poison their arrows. The rest of the jungle consisted of common jungle trees, immense creepers, and the common bamboos; tracks of elephants and wild hogs were numerous, but no marks of the rhinoceros, which is confined to the more level part of the country where grass is abundant.

" *19th.* Direction North, 55 West. Time, 3 hours, 15 minutes; distance, 8 miles.

" 7. 30. Path along the stony bed of a stream.

" 7. 55. Skirt a ravine to the eastward.

" 8. 30. Crossed the *Keung Cank*[18], or crooked stream, eight or ten times running in various directions.

" 9. Path a little better, but repeatedly crossed by the *Keung Cank.*

" 9. 45. Halted on the banks of the *Ween Wee*[19], a small stream 15 or 20 feet wide, which falls into the *Thaung-Ein*[20] to the north-eastward. The path to-day was wet and bad; the jungle thick. No marks of inhabitants. Were joined in the evening by four Musulmans, who, together with seven who accompanied us, and five sepoys, make the party amount to forty-two persons. Those who joined us to-day came by the *Gyne*[21] road in nine days from *Maulamyne*, five by water to *Daggue*[22], and four by land. They represented the road as bad, and hilly, only accessible to people unincumbered, but inhabited by Careens, five or six of whose villages they had passed.

" *20th.* Direction North, 35 East. Time, 2 hours; distance, 4 miles.

" 7. 30. Crossed the *Ween Wee*, and ascended a rather steep hill and proceeded along an ascending path, which appears as if cut along the face of the hill on the bank of a ravine 300 or 350 feet deep, but clothed with small trees and verdure, as are all the hills, even those which are nearly perpendicular.

" 8. Descending along a similar path through a jungle of the large bamboos; paths particularly good.

" 9. 45. Descended along the rather steep bed of a stream, water uncle deep; path extremely bad.—9. 55. Came to the bank of the *Thaing-Ein*[23] (called by the Shans *May-pmoie*) river, wide 160 or 180 feet; moved a short way down the western bank, north 20 east, in the direction of its course, and crossed over to the eastern side by assistance of a boat and some bamboo rafts. I had been led by the guide to believe that we should be met here by some chiefs of the *Zimmay* country with elephants, &c. to assist us in transporting the baggage and presents, and to accelerate our movements towards their capital; they had, however, decamped eight or nine days before our arrival, and we took possession of their sheds, which were the first human habitations we had seen since leaving the boats. The *Thaing-Ein* river is the old boundary between the Burman and Siamese countries, and is now the British boundary in this direction with the latter nation. It arises in this range of hills about eight or ten days' march in a south-easterly direction from this, about one day's march from the course of the *Gyne* river, and falls into the *Mein-lun-ghee*[24] (called by the Shans *Mun-neum*) two days west from this. The united streams fall into the *Thaluru*[25] some distance above a cataract in the latter river, which entirely cuts off all water communication with the country above it, and in which even timber is shattered to pieces that happens to get into it.

"21*st*. Felt the first effects of being in the Siamese country, in being obliged to halt till the road was cleared by the Careens. There was an evident desire on the part of the Careens, who met us here, to detain us for a day or two: they indeed privately declared their orders from CHOW HO KIO, the chief who was to have met us here, to do so. I, however, intimated my intention to proceed on the following day. We were here furnished with a pig, rice, and fowls.

"22*nd*. Direction North, 20 East. Time, 2 hours, 30 minutes; distance, 6 miles, 2 furlongs.

"7 A. M. Proceeded along a good path through a patch of cultivated ground, where the Careens grow the hill rice, which is fine and small in the grain.

"7. 15. Ascended.—8. Crossed the *May-tha-woe*[26] river, wide 60 feet, clear stony bed; abundance of fish.—8. 45. Path along the side of a hill of the same character as last march. On the top of a steep rocky hill above the road is perched the first Careen village we saw. The houses are entirely composed of bamboos; the roof, with a very little slope, is made of two rows of split bamboos; the first row with the concave side up, and their edges touching the second, with the convex side up, and their edges in the trough of the first, embracing the two contiguous edges. There were only three houses in the village, the inhabitants of which, old and young, might amount to forty or fifty people; abundance of pigs, poultry, rice, &c. The people are dirty in their persons, and the skins of the men generally rough and scaly from exposure;—they were much alarmed at our first approach, but we gradually gained their confidence.

12. 30. Continued our march, and at 1 halted on the side of the *May-tha-woe* (which we frequently crossed in the course of to-day's march) in thick jungle, within sound of a heavy fall of water.

"23*rd*. Direction North, 20 West. Time, 2 hours, 30 minutes; distance, 5 miles, 6 furlongs.

"10 A. M. Having sent the coolies on three hours before, on account of the steepness of the hills: proceeded along a pretty good elephant path up the *steepest* hill we had yet ascended.—10. 45. A plantation of small seed cotton.

"11. 50. Reached the top of the ascent, from which we could count seven ridges of hills which we had crossed, running north, 20 east, to south, 20 west, but very irregular and broken in the descent.

"12. 5. Crossed the *Tsieu-dzoé*[27], (Elephant's tusk) rivulet, wide 15 or 20 feet.—12. 30. Halted on the banks of the stream at the foot of an extensive hill, covered with paddy stubble; the Careens say they reap 30 or 40 folds; and the rice is the finest I have ever seen, almost transparent, and when boiled beautifully white. The Careens of the hills have no cooking or eating apparatus;

the rice and a sort of vegetable stew are boiled in a joint of the bamboo, and the latter served up in another split in form of a trough, round which they squat with their rice on any leaf they can find large enough; there is one shell spoon in the stew which serves the whole party. This day's march was one of much labour to the coolies: many of them were seven hours on the road.

"24th. Direction North, 20 West. Time, 3 hours, 15 minutes; distance, 7 miles.

"7. 30. Proceeded along a worse path than usual, over a succession of hills, many of them covered with paddy to the tops, which would indicate a very considerable Careen population. The greater part of the hills this day were of primitive sandstone.—11. 10. Halted by a small stream at the foot of a hill.

"25th. Direction North, 60 East. Time, 4 hours; distance 9 miles.

"7. 30. Ascended a rather steep hill along a path much the same as we had travelled for the last few days.—9. 25. Marched along the bed of a stream about knee deep; the bottom rocky and broken, the water extremely cold, and the sun hot and beating on our heads till 11. 30, when we halted on the banks of the *Moy-Gnow*[28] river, (wide 150 or 160 feet) running to the northward and falling into the *Mein-lunghi* about one day above where the *Thaung-Ein* falls into the same river. No marks of cultivation throughout this day's march. Passed a number of teak and *thet-tse* trees: of the former there is an extensive forest on the eastern bank of the *Moy-Gnow*, but the falls of the *Thaluin* render it extremely difficult to transport it to the coast. The famous *thet-tse* varnish is merely the juice of the tree, which exudes from notches made in the bark into vessels placed to receive it, and is fit for use without further preparation. The tree has somewhat the appearance of the bastard teak. Saw also several small carroway trees in the jungle.—One o'clock. After a flourish of gongs in the jungle on the other side of the river, several Shans made their appearance, and a Burman of the party pushed over to our side of the river on a bamboo raft, and after ascertaining that I was not accompanied by an army, as had been reported by the Careens, communicated the fact to those on the other side: four petty chiefs, the heads of the party, then came over; they said they had been sent by the chief of *Zammay* to welcome me, and offered us their assistance for the rest of the march. They dispatched a letter to *Zammay* to announce our arrival, and begged us to remain one day on the present ground, assuring me that they had five elephants for my use. These elephants were a very seasonable relief, as the people were much knocked up, and the nature of the paths over steep hills or stony beds of small streams, had precluded the possibility of my riding for a single march.

"26*th*. Halted till some bamboo rafts were made to transport part of the baggage, which could not be carried on the elephants down the *Moy-Gnow*. I found that the chiefs who met me were part of the licensed robbers of *Labong*, and one of them (a Burman formerly captured in one of their predatory expeditions) was exceedingly anxious to excuse them for carrying off some of our people last year, as they were mistaken for Burmans. The Careens brought three pigs, some fowls, and rice, enough for the whole party: the Shans would not allow me to pay for them; hitherto every thing had been paid for that was brought to us.

"27*th*. Direction North, 30 West. Time, 5 hours, 30 minutes; distance, 15 miles.

"9. 30 A. M. Marched through a beautiful forest of teak and *thenghan* trees, on both banks of the river, which we crossed no less than nineteen times, occasionally following a path, more frequently without any, and the river in many places just fordable by the elephants; the whole of the baggage and most of the people were conveyed either on the elephants or on the bamboo rafts.—3 P. M. Halted on the east bank of the *Moy-Gnow*, having crossed one or two trifling hills in the course of the day, but the march was on the whole a slight descent, as we followed the course of the stream through the hills towards its mouth; the country was entirely uncultivated, and destitute of any sign of inhabitants. The wild elephants are much more scarce on this than on the western side of the *Moy-Gnow*, and even there much less numerous than on the British side of the *Thaung-Ein*. Tigers, deer, wild cows, &c. &c. are, however, numerous here. The Shans march without tents or coverings of any description, and make little huts of branches after each march in the same manner as the Burmese.

"28*th*. Direction North, 30 West. Time, 4 hours, 15 minutes; distance, 12 miles.

"11 A. M. Crossed the river ten times, and proceeded along the banks through a country of the same character as yesterday, with scarcely a sign of a path, and learned that this road is never travelled except by the chiefs when collecting the tribute from the Careens, who, in the neighbourhood, are tributary to *Ponya*[29] or *Benya-tche*, the principal of the four little chiefs who came to meet me.—3. 15. Halted on the east bank of the river, about the same width as when we first came on its bank.

"29*th*. Direction North, 25 West. Time, 2 hours; distance, 6 miles.

"9 A. M. Continued our march along the banks of the *Moy-Gnow* till about 10 A. M. when we left it to the westward, and, crossing a rather steep hill, came at 11 o'clock on the banks of the *Mein-lun-ghee* (running to the southward; wide about 120 feet) a short way above where it is joined by the *Moy-Gnow*.—11 A. M. Crossed and halted. Saw numerous marks of elephants, deer, elk, and hog, in a soft part of the jungle to-day: the Shans say that they all eat that sort of mud, a kind of black stiff (probably saline) loam or rather clay;—killed a small animal to-day called by the Burmans *Poe*[30], and of which I do not recollect to have seen any description. The head is large and round, like an otter; the cutting teeth like a rat, and feet slightly webbed, somewhat resembling in appearance, though inferior in strength, to the moles. The fur exactly like that animal, but larger in the staple, and, I think, even finer—it is little larger than a common English mole, and burrows with great rapidity. There are two kinds of the same animal; the other differs in being much larger, and the hair coarse and harsh, like the bandicoot. I regret that the specimens I obtained were both lost.

"30*th*. Direction North, 30 West. Time, 4 hours; distance, 12 miles.

"10. 20. Continued to march along the *Mein-lun-ghee* in the same way as we had done along the *Moy-Gnow*. Crossed twelve times to-day. Its average breadth 130 or 140 feet, and depth about six feet. Its course continues amongst the hills, which are covered with teak and *that-tse* trees, as those of the *Moy-Gnow*.—At 2. 20 halted on the western bank of the river in a small patch of paddy in a plain of few miles extent; the first lowland paddy we have seen since leaving the *Thalween*, and the first of any cultivation since joined by the Shans.*

"31*st*. Direction North, 20 West. Time, 4 hours, 10 minutes; distance, 12 miles.

"8. 15. Marched to-day along a path better than any we have seen since crossing the *Moy-Gnow*.

"11. Passed the village of *Bowtaa*[31]; 12 or 14 houses surrounded by a small patch of cultivation. Having crossed the *Mein-lung-hee* river four times to-day.—12. 25. Halted in a rather extensive patch of paddy stubble belonging to the village *Kapa*[32], which is distant a mile and a half. Nearly the whole of the country between this and the village, which is in a small valley, has last year been under cultivation; all the rice in the country is of that glutinous description called by the Burmans *kanghuyeen;* the only hard rice that can be obtained is from the Careens, who left us to-day, and by whom we have been accompanied from the neighbourhood of one village to that of another since leaving the *Thalween*. They are a fair, well-limbed, athletic race, superior in appearance generally to the Talines and Burmans, but have been oppressed from time immemorial by Talines, Burmans, and Shans, whoever happened to have the ascendance. They have been obliged to furnish provisions, erect huts, cut the jungle from the edges of the path, and furnish guides to all travellers crossing the hills, the latter of which services they performed for us, and were much surprized at being paid for whatever they furnished us. They annually shift their habitation, and if they pitch upon a site near a path, it is immediately shut up. In addition to the other inhabitants of the jungle, we to-day saw marks of rabbits in considerable number.

"*January 1st*. Direction North, 20 West. Time, 4 hours, 50 minutes; distance, 14 miles.

"9. 45. Proceeded along a good path through the paddy grounds of the village of *Kapa*, which we passed at 10. 20, consisting of about thirty or forty houses precisely in the Burman style, with one or two *Pungee*[33] houses, but no pagodas, &c.—11. 25. Passed the first pagoda we have seen since leaving *Thalween*, perfectly dilapidated. Near a small village saw 70 or 100 heads of good cattle in a rather extensive paddy field.—2. 35. After traversing a grassy plain intersected with belts of jungle, halted on the south bank of a small stream running to the westward and falling into the *Mein-lung-hee* river about quarter of a mile from the village of *Mein-lung-hee*. The path to-day was well marked, and there was more appearances of cultivation than we had before seen. We only crossed the *Mein-lung-hee* river three times. The rise of water in the rains, from the marks on the trees and banks in this river, cannot be less than 30 or 40 feet.

"The Shans being anxious to detain me on the road till an answer is received to the letter notifying my arrival, dispatched on the day I met them, I have consented, as I cannot well proceed without their assistance, to remain here two days."

The town, or rather village, of *Mein-lung-hee* at which Dr. R. arrived this day, is a collection of huts about 200 in number, scattered over an extensive plain of 3½ or four miles in width, through which the river of the same name runs, having its rise about fifteen or twenty days' journey north, and pursuing a southerly course nearly parallel to the *Salween* till joined by the *Thoung-yeen*, when the united streams take a westerly course and enter the *Salween*. The town is under the jurisdiction of *Labong*[34], from whence a governor is appointed, who levies contributions from the Kayen tribes in the neighbourhood, and is not scrupulous of occasionally extending his exactions into our portion of the country. Such is the wild life and timorous nature of these tribes that they submit to any one who appears invested with any authority, and it is difficult to induce them to visit *Maulamyne* with their complaints. *Mein-lun-ghee* being the first frontier station, is generally passed through by the traders of *Maulamyne*, and the Shan States also by those of the latter, who visit the country of the Red Kayens to purchase slaves. An effort was made to detain Dr. R. here, till an answer should be received from *Labong* regarding him; but on evincing a determination either to proceed or to return immediately to *Maulamyne*, elephants were furnished him, and he resumed his route on the 6th.

"*6th.* Direction South, 80 East. Time, 3 hours, 30 minutes; distance, 10 miles.

Six elephants were produced, and at 10. 20 we proceeded across the valley to the south-eastward.—11. 12. Commenced the ascent of the eastern hills, which is gradual but considerable.

"1. 15. Crossed the *Moy-Konie*[35] within quarter of a mile of a fall 60 or 80 feet to the S. W. of the road.

"1. 50. Halted on the banks of the *Moy-Konie*. Three of the elephants had four young; all born in captivity, which the Shans speak of as a thing of course: one of them had two, one about six years old, the other about 2½ or 3, still sucking. We here left all the little chiefs, but BENYA-CHI and the Burman who was taken prisoner twenty-five years ago. The road to-day (one of the principal routes to the *Careen Uee* (or Red Careens) country) was good, and the hills not very steep.

"*7th.* Direction South, 80 East. Time, 7 hours, 50 minutes; distance, 14 miles.

"8. 55. Steep ascent for two hours; great part of the way in ruts as deep as the elephants' backs worn by the mountain torrents.

"11. The mist on the hills and valley below us with a beautiful clear sun on it, had exactly the appearance of snow. A cold piercing wind from the eastward.—11. 15. Narrow road along the side of a hill which rises perhaps 150 or 160 feet above it, with a deep ravine below to the eastward.—12. Continued cold and chilly; left the elephant; steep descent for nearly an hour.—2. 45. Halted on the banks of the *May-lie*[36] (which falls into the *Mein-lun-ghee* about a day below the village) on a beautiful little plain surrounded by high hills, and bounded on the south-west by the stream 10 or 12 feet wide.

"The march to-day was almost a continued ascent; some of the hills very steep; the elephants frequently obliged to stop from fatigue; the paths tolerably good, evidently much frequented, and said to be cut by a Shan king[37] of great power, but evidently the tracts of elephants deepened by the torrents, in many places as deep as the backs of the elephants, not more than 18 inches wide at the bottom, and just clear of the howdahs at the top. The elephant from which I dismounted at 12 did not come to the ground till 4. 45, and was consequently

8 hours, 50 minutes on the road; some of them did not arrive till an hour afterwards from the difficulty of the ascent.

"*8th.* Direction North, 70 East. Time, 5 hours; distance, 12 miles.

"9. Continued to ascend the hills in a path rather better than that of yesterday; free from ruts.—10. 45. A good broad road along the side of the hills for an hour or two.—2. Halted on a small plain near the *Lowa* village of *Meing-lay-been*[38] containing five or six houses. The nights have gradually been becoming cooler as we ascended, and there are seven of the people ill with fever in consequence. The thermometer stood at 46° in the tent this morning at 8 A. M.

"The jungle plantain, thet-tse, bamboos, and pine in luxuriance, the latter forming the principal part of the jungle (or forest, for it has lost much of its density in these upland regions;) the creepers have almost disappeared, and the trees which form the crest of the hills to the westward may almost be counted in the afternoon, and might be traversed with little difficulty.—At 11. 15 to-day from the top of one of the high hills nothing could be seen as far as the eye could range but masses of hills rising one above another, covered with the same description of jungle to their summits, but no snow to be seen; if they can be said to be disposed at all into ranges, it is between S. S. E. and N. N. W. but they are extremely irregular and broken.

"*9th.* Direction North, 45 East. Time, 6 hours; distance, 10 miles.

"8. 55. Continued to ascend.—2. 30. Open forest, composed entirely of fir trees, tall, straight, and free from branches, to the height probably of 50 feet.

"2. 55. Halted at the *Lowa*[39] village of *Bo*[40], situated in an open plain in the forest, perhaps of 12 or 15 miles in length by five or six in breadth, as has been the case ever since leaving the *Mein-lun-ghee.* Our march has been a continued ascent, but gradually surmounting hills in succession, with several descents throughout; we are now said to occupy the highest and coldest halting place on the road; the fir has been the most numerous tree throughout the march, and the only one during the latter part of the day. The village of *Bo* consists of 60 or 80 houses: the people are all ironsmiths, and are exempted from all service but furnishing elephants' chains, cooking pots, spears, and other iron-ware to the Shans during war, or for military purposes; the iron ore is a red oxyd, and is found in immense masses in a hill to the north-westward less than one day's journey. It is brought to the village on elephants and melted in a simple furnace—yields nearly 50 per cent. of metal, soft and unfit for knives, ploughs, shears, &c. &c.; they have not the art of hardening it. The people are said to be rich, particularly in elephants, of which there are not less than sixty or seventy in the village.

"*10th.* Direction South, 65 East. Time, 5 hours, 40 minutes; distance, 14 miles.

"10 A. M. Ascended by a good path, much frequented throughout.—10. 20, descent.—1. 25. Saw the *May-ping*[41] river, which falls into the sea at *Bankok.*—2. 20. Rocky steep, difficult descent.—3. 15. Crossed the *May-papie*[42] river, knee deep, running easterly.—3. 40. Halted on the banks of the *May-papie* on a small grassy plain. Since 12. 20 we have been descending; the road though rocky has been pretty good, the air is decidedly milder, the pine has been gradually diminishing in numbers, and now not one is to be seen; the jungle just here is very close; the rocks throughout the latter part of the march old gray sandstone, previous to which they have been granite with a large portion of felspar.

"*11th.* Direction North, 80 East. Time, 4 hours; distance, 12 miles.

"8. 40. Crossed the *May-papie*: good path and less precipitous.—11. 50. Crossed a small dry rivulet in which rubies of small value are found.—12. 5. Crossed the *May-Haut*[43] about knee deep, by which the paddy between this and the village is irrigated; nearly all the paddy in the plains of the valley of *May-ping* is cultivated in the same way.—12. 30. Halted at the village of *Maing-Haut*[44] (pronounced by the Burmans *Mein-Woot)* on the west bank of the *May-ping*, which runs to the southward and falls into the sea at *Bankok* after joining the *May-nam*[45].

"The march to-day continued to descend gradually, with a few trifling acclivities till 12; since which nearly level; the climate proportionately improved; the jungle has assumed the same character as on the other side of the hills, but more open.

"We are now fairly in the valley of the *May-ping*, and have the prospect for the next three or four days of seeing something of the level country, but the whole extent of the country between the *Thalween* and *May-ping*, with trifling exceptions (such as the little valley of the *Mein-lun-ghee*), is one succession of mountains; nearly all of the primitive series, principally gravel gneiss trap, lime and sandstone.

"We crossed the *May-papie* thirteen times to-day. The village *Maun-Haut* contains about sixteen houses of the most uncomfortable appearance; it is about 12 days from *Bankok*, with which the communication is frequent; the river here is about 200 yards across, and rather rapid; there are a number of palmyra, cocoanut and other fruit trees, both here and on the opposite side, where there is also a small village.

"The river here is a little wider than above or below the village, and just fordable by elephants; there are few fish in the river, and the people almost ignorant of the art of catching them. On endeavouring to procure boats as the easiest conveyance for the sick, I was not a little surprised when only one small canoe could be procured, in which only one of the worst cases could be sent forward.

"Remained here one day at the request of the persons who accompany me, in order to transmit intelligence to *Labong* of our approach.

"*13th.* Direction North, 20 East. Time, 5 hours; distance, 15 miles.

"9. 15. Road lies along the foot of the western hill; the river turns towards the eastern hills, which are distant about 20 miles.—11. 55. Crossed the *Nam-May-tcheem*[46], wide 100 yards; fordable by elephants.—1. 45. River 200 yards wide; full of shoals.—2. 5. Crossed the *May-ping*, and halted on its eastern bank in an open jungle, where a house[47] had been built for our reception. The road to-day has been nearly level and much frequented; the whole of the valley was inundated last year to a greater extent than is recollected by the oldest people, the paddy being nearly all destroyed, and the people obliged to take to the hills.

"*14th.* Direction North, 30 East. Time, 5 hours, 15 minutes; distance, 16 miles.

"8. 15. Road good level.—9. 55. Grassy plains.—1. 30. Crossed the *May-lie*[48], which falls in the *May-ping* four miles to the westward, wide about thirty or forty yards; halted on the eastern bank at the village of *Naung-long*[49].

"15*th*. Direction North, 60 East. Time, 7 hours; distance, 21 miles.

"8. 5. Road good, passable for bandies.—12. 20. Grassy plains intersected with jungle.—1. Western hills distant 20 miles; eastern hills, 4 miles; hills in sight to the northward.—1. 30. Paddy ground; numbers of buffaloes and black cattle.—2. 10. Halted between the village of *Bansan-kanoy*[50] and *Bansoupta*[51] on the western bank of the *May-ta*[52], a small stream, which falls into the *May-quang*[53] about a quarter of a mile from this, and from thence into the *May-ping* a quarter of a mile further to the south-west.

"The road to-day has been very good, much frequented and passable for a bullock cart; throughout marks of recent inundation are still very visible; oranges, pummaloes, pine apple, mangoe, palmyra, cocoanut, guavas, and other fruits are abundant; the first and the cocoanut are the only two now in season. The people have much improved in appearance; some of the women and children are nearly as fair as Europeans: many of the latter with light hair; the eyes are large and expressive, not at all like the Chinese; the nose, however, is small, like the Burman.

"They have had a report current here for the last month, that the English were coming up with 1,000 men, which has alarmed them a good deal. A letter has been dispatched to the people here to-day, telling them who I am, and ordering them to supply me with every thing I want; and the messenger begged I would remain here two or three days, till the road was made smooth and every thing ready for my reception at the capital. There is no way of avoiding their ridiculous delays."

Dr. R. was delayed here a few days, on the plea of preparing for his reception, and ascertaining from the astrologers a lucky day for his visit.

"20*th*. Direction North, 20 East. Time, 2 hours, 10 minutes; distance, 6 miles.

"10. 20. Started on horseback with ten or twelve elephants, each having a little either of my baggage or presents. At 11. 35 I was met by the second son-in-law of the *Tsoboa*, the 3rd chief of the province, with fifty elephants. On each were mounted some of the numerous relations of the chiefs. They had brought a spare elephant for me, on which after complimentary speeches of welcome, I mounted, and we continued our march; the elephant on which I rode being last. In this procession we proceeded slowly towards the town, occasionally stopping to let the elephants pull the pine apple plants and plantain trees out of the gardens of the poor people, with whom the chiefs chatted on the most familiar terms.

"At 12. 30 we arrived at this spot, about a mile from the town, which they had fixed on for my encampment. My tent was already pitched in a little square of sheds, which they had built for the people. The chiefs remained with me about an hour, examined the muskets, talked of our soldiers, &c., and then took their leave. On inquiry I found there were two chiefs from *Layon*, but none from *Zimmay* present. There is only a small portion of the walls of the fort visible from this, and none of the houses; and from the immense number of cocoanut and betelnut trees growing inside, it has more the appearance of a forest than a fort; the tops of two pagodas (one of which is gilt) are visible over the tops of the trees; the whole country is so covered with wood that not twenty houses are to be seen from this place: there are as many round the Fort as there are in it. It stands on the right bank of the *May-quang*[64], which is here about 30 feet wide and three deep at this season, though navigable for boats of some burthen during the rise of the river. The *May-quang* falls into the *May-ping* about half a mile from this (in the valley of which river both this town and *Zimmay* are situated), which pursues its course amongst the hills from this to within a few days of *Bankok*, where the hills terminate, and the country spreads into a plain populous and fertile. The valley varies in breadth from 10 or 12 miles to 60 or 80; the soil is a rich sandy loam, and from the beds of the river apparently of great depth; the hills are of very considerable height, but no snow is visible from this, though the thermometer at 7 o'clock is seldom above 53°. The distance from this to the frontier towns of *China* is about 40 elephant marches (probably of 12 or 15 miles each) over the northern hills, and throughout that distance no snow is said to be encountered; but to what other cause than snow the rise of the river can be attributed, I am ignorant; as it is thought a heavy monsoon if there are three or four days of heavy rain in a month. The annual rise of the river is considerable, and last year was so excessive as to drive the whole population from its bank.

"I have had no communication with any of the chiefs to-day, but a letter was sent to the person (a Benya) left here to provide any thing I might want, to keep the Pungees and the people from crowding round my tent, in consequence of a representation of mine yesterday. The bearer of the letter said it was the wish of the chief that I should be presented to-morrow, and begged that I would not bring any pocket pistols or any other hidden instrument of death; I requested to know if I should wear any sword, as it was looked on by us as a mark of respect; to which they also objected. The materials have this evening been brought to build me a small house.

"*21st.* At 12. 30 sixteen coolies with seven large silver, and nine copper calats (salvers), and a body of peons armed with spears, came out to carry the presents and conduct me to the presence of the chief.

"The walls of the fort are formed of the red ferruginous porous stone common in Burmah at the bottom and the top of bricks of the most slender construction; the sides of the streets for a few yards were lined with the common people, bearing muskets; the shed (about quarter of a mile from the gate) in which the chief received me, was about 60 feet long and 20 wide, with three sheds at right angles built for the occasion, occupying the whole of the front, all of which were filled with people; many of them near relations of the chief, and all in the crouching position common with the Burmans; nearly all armed either with swords or muskets. The presents had already arrived, and were placed at the upper end of the centre shed. Having made a bow to the chief, I went immediately up to his seat (a small light chair) and presented the letter. I said that I was fortunate in being the first to open the road of friendship between the two countries, that it was the wish of the English Government that the merchants of each should be as uncontrolled in the territories of his neighbour as if they were in their own, &c. &c. He answered, he had long turned the eyes of friendship towards us; that he was happy the gold and silver road had been opened; that he hoped we should now be as one people, but that the presents must be sent to the king of Siam, whose instructions would be taken. He wished to know what terms we were on with the Burmese. I said on terms of friendship: that after a war of two years they had sued for peace, and had obtained it—that they had nearly fulfilled the terms of the treaty, and that it was a principle of the English to forget an injury as soon as reparation was made. He said such was not the case with them; that they had been at war with the Burmans for ages, and that they killed or made slaves of them whenever they had it in their power—that the Burmans were equally inveterate. He then asked if I thought I could obtain an order from the Commissioner of *Maulamyne* for the Burmese to give up some tribes of Shans who had originally formed part of their kingdom of *Siam*. I said they were Burman subjects; and though we had conquered the greater part of their kingdom, it had been restored to them, and that we had now no control over them. He said that we had the *Thenieu*[55] or *Siriam* Shans with us; that they were originally from *Caung-Ghan*[56]; and that if they wished to return to the land of their forefathers, he hoped that they would not be prevented. I said, that *they* were our subjects, and that if they wished to return, every facility for doing so would be afforded them.

"I thought this too favorable an opportunity to be missed, as I knew nearly every one in court was aware of my being acquainted with the circumstance of thirty or forty families of Burmans having been carried off by his people when coming to *Maulamyne* with a pass from Sir A. Campbell. Seeing the person who carried them off in court; and a Mussulman merchant being with me who had represented the impropriety of their proceedings at the time, and fearing that an unfavorable construction might be put on my silence and a precedent for like enormities in future; knowing also that Major Burney had demanded and obtained from the court of *Siam* the liberation of several hundred people carried off by the Siamese from about *Mergui* and *Tenasserim*; I thought it my imperative duty, as the business had already in some degree been agitated, to endeavour to obtain their release, notwithstanding my instructions were not to interfere in the matter if it could be avoided. I therefore said, I hoped equal indulgence would be granted to the *Taline* people who had been taken with the British General's pass. He denied having seen the pass, though I believed at the time and have since heard that it was shewn him when several of the *Zimmay* and *Logan* chiefs were present—that their liberation was agitated and opposed by the *Zimmay* chiefs. The chief who carried them off being in court, and having been before pointed out to me, I immediately put it to him, and he acknowledged that the pass was still with him, but no one present understood English; that they were ignorant of its contents, but it should be brought to my tent in the evening. Chow-tche-Weet said it should be made known at *Siam*, and that they must abide by the instructions from thence. I mentioned the circumstance of Major Burney's mission, and said I was sure it only required to be made known to his Siamese Majesty. The old chief was evidently much embarrassed during this part of the conversation; however, in case of any thing further being done towards their liberation, he cannot again plead ignorance. I repeated the hope that our intercourse might be free and unrestrained, and was again told that they must wait for instructions from *Siam*. I said that they might come to our settlement on the coast with the same freedom they would go to *Lagon* or *Zimmay*, and requested that Ponya-tche (who had asked me to make the request) might be allowed to accompany me to *Maulamyne*, where he would see the facility with which business was carried on amongst us, and the advantage to both countries which would arise from an unrestrained trade. He said he was about to send him to *Bankok* with the presents I had brought in the course of next month. I hoped he would find it convenient to send some one else, and from the great number of chiefs I there saw round the hall, I thought it could easily be managed. I then took my leave, and in the evening PONYA-TCHE called on me, expressed himself much disappointed, and begged I would not give up the point. He was persuaded if I repeated the request he should be allowed to accompany me, and as he is one of the most intelligent persons I have met here, and the ultimate object of the Mission likely to be forwarded by his accompanying me, I promised I would do so. I asked him if there was any objection to my riding through the fort, &c. &c. He told me CHOW-TCHE-WEET had desired him to tell me I was at liberty to go where I pleased in the day, but that the gates of the fort were shut at night, and that it was rather expected I should call on some of the lesser chiefs, his numerous relations. I proposed calling to-morrow on his son-in-law, and one or two others of the chiefs who met me on the road and remained here the day I arrived."

The following are extracts from Dr. R.'s journal during his residence here, which are the most likely to interest the general reader.

" They had no idea that any European would attempt to cross the hills. I visited CHOW HOUA[57*]; he is an intelligent man, about 40, of quiet and agreeable manners, to whom the chief government of the province is entrusted. The whole conversation was of the war with the Burmans, their hatred to whom is only exceeded by their dread, and their expressions of friendship for us proportioned to their idea of our power from having conquered the Burmese. The *Zimmay* chief who is nephew to CHOU-TCHE-WEET is by no means so friendly to us as the others, and there is some sparring between them now, about my being allowed to come here. On my return in the evening I found CHOW-NI-MOI-KOIN at my house with two of the first chief's wives and several musicians, waiting to entertain me with a nâtch and singing; the music was particularly pleasing. One man, a northern Shan, sang remarkably well, both as to taste and execution, much in the style of the Chinese, but much superior to any thing I ever heard in that country. I presented a cotton handkerchief and a Madras rupee to each, with which they were highly pleased.

" *24th.* Rode round the fort to-day, which is of an irregular form; the largest end towards the south. The east, west, and southern faces are nearly of the same length (probably 15 or 1600 feet); the north end not more than 1,000. The wall is from 15 to 23 feet high outside, and from 13 to 18 inside, and of the most flimsy possible structure, with four gates in the east and two in the south, two on the west, and one in the north face, surrounded on three sides by a wet ditch of 60 or 70 feet wide and in good repair. On the east side the river flows: at this season it is not more than knee-deep; at the gates are guards of half a dozen coolies without arms. On the eastern bank of the river opposite the fort are the remains of an old stockade of equal size with the fort, with brick angles and bastions. The houses are more numerous without than within the fort. On the western side is an extensive plain of rich

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[*] The title of the heir-apparent to the chieftainship.

paddy ground as far as the eye can reach from north to south, and five or six miles from east to west covered at this season with many thousand head of cattle, buffalos, also elephants in considerable numbers. Saw some of their bandies, which are the best specimen of their workmanship I have seen; the wheels are exactly like, and equal to those of a common English cart.

"25*th*. I have heard to-day that orders have been given to the people not to buy any thing from the merchants who accompanied me, and not to come about my house. Yesterday they endeavoured to exchange their goods for cattle, but the people dare not sell without orders, though anxious to do so. I sent the interpreter to Chow-tche-Weet, as is the custom here, to intimate my intention of calling on him. He excused himself on account of indisposition. I told the interpreter also to say I was anxious to return on Saturday or Sunday at farthest, and to inquire if there were any objection to my going to *Zimmay*, to which I received no answer.

"Called on Chow Rajawoon, an elder brother of Chow-tche-Weet's, but by a concubine; he lives in a small bamboo house outside the fort, but has gold betel apparatus, the gift of the King of Siam, which is only given to chiefs of rank. He has twenty-eight wives, and told me with evident exultation that they were all taken prisoners by himself but one. He was chief of the Dummyas, or licensed robbers, for many years,—a situation of some honor and danger, where the most barbarous system of border warfare is carried on with the most rancorous hatred, and where the State looks upon the prisoners taken by these treacherous midnight robbers as a principal source of its population.

"I represented to Chow Houa the inconsistency of the friendly expressions towards us, whilst the very object of my visit, from which they ought certainly to expect much advantage, was defeated by prohibiting their people from purchasing the things they were anxious to be in possession of, from the few poor people who had accompanied me; that it was bad encouragement for future caravans on a larger scale; but to convince them we perfectly trusted in them, the merchants would remain till their things could be disposed of, and that I would give a note of their names and numbers.

"26*th*. I received a visit from Chow Houa to-day, the purpose of which was to induce me to remain here for two months, till the presents I had brought were sent to *Bankok*[56] and the King's sentiments known. I told him my reception had been such that I could have no objection to remain twelve months, but that the purpose of my visit had been to assure them of our friendly disposition towards them, and open a friendly communication between *Maulamyne* and the *Shan* country; that we had been on the most friendly terms from time immemorial with the King, or I could not have been sent to any of his allies or dependencies; that they were now aware of our sentiments and our anxiety to be at peace with all our neighbours, and that I wished to return on Sunday the 31st.

"29*th*. Paid my second visit to Chow-tche-Weet to-day, who sent in the morning to say he would be glad to see me; I was received as before, but with less stiffness and more cordiality, and there were no armed people in the street. He repeated his declarations of friendship towards the English, which I see no room to doubt; and said the only reason we were not on the same terms as natives of the country, was the bad feeling of the *Zimmay* chief towards us, and that they had sent to *Siam* to endeavour to bring him under the king's displeasure for having received me as he had.

"I begged to know if Chow-ni-moi-Koin and Ponya-tche would be allowed to accompany me, and told him I was anxious to start on Sunday 31st. He said in that case it would be impossible for them to accompany me, and hoped I would wait nine days, when every thing would be ready, and a lucky day, and they should then proceed along with me. After some consideration, I said that though my instructions were to return immediately, I would take on myself to remain. 'Then,' said he, 'every thing is settled very soon; if you have any thing to ask or communicate, do it without reserve.' I then produced the General's pass, which mentions 1100 people, though there are now scarcely 100 remaining, the others having escaped as opportunity offered; and asked what were his intentions regarding those people; and as I had little doubt of his refusing to liberate them, and I had no authority to demand them, I added, that as our friendship was sealed and they were apprehensive of the King of *Siam*, I did not wish to press their immediate release, but begged he would allow the heads of the villages now left (who was the person they had selected to bring the letter to *Maulamyne*) to accompany me, and communicate his case to the Commissioner, that from the constant and friendly intercourse we had with the King of *Siam*, and his having given up our people who were carried off from *Mergui*, I had no doubt of the result. He readily agreed to the man's accompanying me, but begged jocularly that I would not give him up to the Burmans, who were a thorn in their eye, which seemed a signal for the conversation to become general; amongst other things he told me he had 80 wives, 18 sons, and 16 daughters, of whom one is an inferior wife of the King of *Siam*, but has unfortunately no children; that his relations in the three towns amount to upwards of 700; that there were 30 guns in this town, and 40 in *Lagon* and *Zimmay* each; (a Burman prisoner here has offered to eat all above ten in the three places;) that there are 4,000 inhabitants in *Laboung*, 40 or 50,000 in each of the other towns:—this is also of course very much exaggerated. The people who accompanied here to-day, after many pros and cons, received an order to buy forty-two bullocks for carriage. A Chinese who is here (father-in-law to Chow-tche-Weet) is to start to-morrow for *Zimmay*, to bring up some of the principal Chinese traders said to have arrived there, and I have strong hopes, from the enterprizing character of the Chinese, they may be induced to visit the coast.

"I was invited into the fort at 3 p. m. to an entertainment, and had the ceremony called "*Pouk*"[59] performed; beyond which I am told there is no possible mark of friendship. It consisted in two old men saying a prayer of some length for long life, riches, and happiness to one of the English Chiefs of elephants and horses and conqueror of the Burmans, and tying seven threads of white cotton round my wrists: the latter ceremony was also performed by Chow Raya Woon, the chief's elder brother, and by Chow-ni-moi-Koin, and I returned the compliment to them. Two large bouquet of flowers, one ornamented with a number of thin silver plates, and some of the flowers being of very considerable but oppressive fragrance, were presented. Sweetmeats were also served up to me, and rice with various curries, both to the people who accompanied me and to the natives, in large silver bowls, to the number of probably fifty, varying in size from a foot and a half to a few inches in diameter: the workmanship of many of those of the lesser size was remarkably good, nearly all gifts from the King of *Siam;* after which seven of the chiefs' wives danced to the music of the *Bankok* band, by which they set great store, and the music is certainly very pleasing. Many of the women possess a very considerable share of Asiatic beauty: their eyes in particular are large and expressive, without a trace of the Tartar; their skin remarkably fair, and had it not been for the little Burman nose, some of them would have been really handsome. There were probably not less than 300 people present—all the chiefs of *Laboung*, many of those of *Lagon*, but none from *Zimmay*.

"*February 8th.* I have at length prepared to start in the morning by the shortest and best route to *Maulamyne.* The only reason for not starting to-day is its being a *black* one, and it would be disrespectful to me, as well as dangerous to themselves, to begin a journey to-day. I took leave of the chief to-day, and have been allowed as an especial favor to buy one (and CHOW-TCHE-WEET has presented me with another) young female elephant, and sends one as a present to Mr. MAINGY.

"Had another visit from some *Zimmay* people to-day, who agree with the others as to the very friendly feeling of the people there towards us. They say they so fully expected me there, that houses have been ready for the last ten days. On taking leave of CHOW HOUA he gave me a rhinoceros horn, on which he seemed to set a great value, as a charm against every evil; and as I had expressed some impatience at their delays and suspicion, he begged I would not suspect them of any want of friendship in so long withholding permission to purchase bullocks and trade with their people; that our character was perfectly new to them; that they were like an elephant crossing the river;—they must feel before they proceeded; that their difficulty was now got over, they were aware of our intentions being good; and that we should now come there on the same terms as subjects of *Siam.*

"In proof of their sincerity and the trust thus reposed in us, BEYNA-TCHE would accompany me with 50 or 60 people, 2 or 300 cattle, and a number of elephants; that they all lived by trade or agriculture, and that some of the CHOW's sons would certainly next year visit our settlement on the coast. He invited me to repeat my visit next dry season."

On the 9th Dr. R. started on his return: he gives the following account of the route he took, which, until the 15th, was the same by which he had travelled on his way up.

"*15th.* Direction South, 30 West. Time, 4 hours; distance, 10 miles.

"12. 35. I started: most of the people having gone on before me.

"1. 30. Came amongst the hills and commenced to ascend.

"2. 12. Broke off from the old *Mein-lun-ghee* road, leaving it a little to the westward.—2. 20. Crossed the *May-papie* in a few inches of water; path narrow, through low bamboo jungle; hills range about south 70 west, north 70 east.—3. 45. Crossed the *May-Gnoot*[60] and halted on the western side in long grass; the bed of the stream rocky and wide 20 or 30 feet, with but little water at this season. Saw two wild cows and a tiger this evening.

"*16th.* Direction South, 50 West. Time, 6 hours; distance, 13 miles.

"9. March along the banks of the *May-Gnoot*, and continued to ascend with few declivities; the path rocky.—10. Rocky steep ascent for half an hour.—10. 55. Saw the first pine trees.—11. 30. Left the *May-Gnoot*.—1. 20. We entered pine forest, and no other tree is to be seen but a few stunted yews.—3. Halted on the N. E. bank of a small stream called the *May-lie*, which falls into the *May-ping* to the eastward; the path has been pretty good, and though rocky in many places, I think less difficult than the *Mein-lun-ghee* road: it is the old road to *Martaban*[61], and has been little frequented for the last seven years; the rocks in all the high hills are granite of very dark colour externally. A good deal of thunder and rain this evening; this halting place is famous for tigers; several people have been carried off from it.

"17*th*. Direction South, 30 West. Time, 3 hours, 20 minutes; distance, 11 miles.

"8. 30. Crossed the *May-lie*.—9. 30. Proceeded by a nearly level path along the top of a small connecting range of hills in a noble pine forest.—11. 30. Descended.—11. 50. Halted on the banks of a small stream, the *May-tome*[62]. Path remarkably good and nearly level for the last two and a half hours; some of the pine trees measured eight or nine feet in circumference, and are much taller and straighter than the same trees in Europe.

"18*th*. Direction South, 45 West. Time, 3 hours, 15 minutes; distance, 14 miles.

"8. 45. Crossed the *May-tome*, and continued along a good path; descending for nearly half an hour.—9. 30. Crossed a small stream.—11. 15. Crossed another small stream, and ascended with occasional small descents till 10, when we halted on the southern bank of the *May-tuan*[63], running to the eastward.

"The whole march to-day through the same fine open forest of pine; the path good and the hills not at all steep. Shot a jungle cow to-day: these are abundant in some of the valleys near our route; the flesh was harder than the worst buffaloe. Tigers and the common deer are abundant.

"19*th*. I have been obliged to halt to-day to refresh the elephants, as the passes are said to be difficult and no forage for three days for them: (there are seventeen large and four small ones.) We are now on the site of an old city[64] formerly inhabited by Talines (to whom all the country to the westward formerly belonged) and more lately to the Shans, but has been deserted some years on account of the devastation committed by the Burmans; the valley is of some few miles in extent, and through it runs the *May-tuan* river, which at this season is about two feet deep, and as it falls into the *May-ping*, was formerly navigable for small canoes to *Bankok*; its course is extremely winding.

"20*th*. Direction South, 50 West. Time, 6 hours, 30 minutes; distance, 30 miles.

"9. Ascended along a rugged bad path.

"10. 17. Descended. The firs which have been gradually diminishing in numbers through the whole of to-day's march, are now only to be seen in single trees towering above the other trees of the jungle.—3. 48. Halted in a ravine of very thick jungle on the west bank of the *May-tuan*, running to the northward.

"The march to-day has been the longest as to time, the most toilsome and disagreeable since leaving *Maulamyne*; the path has been either up or down steep hills, or along the bottom of ravines into which the sun can only shine a few hours in the day; and since half past ten through a thick jungle. Our course has been all round the compass, and I have been obliged to note its direction no less than eighty times to get at any thing like a correct general direction; we are again on the banks of the river which we left this morning, the course of which is even more tortuous than the road we have come. We are encamped on a small level spot of a few hundred yards, surrounded by high hills; the jungle extremely thick, but abounding on the hills with deer of all sizes, cows, buffaloes, tigers, leopards, and rhinoceros. We passed the end of the road, which runs more to the eastward, along which the bullocks are to come; path is much better, but there are no inhabitants in that direction.

"*21st.* Direction South, 65 West. Time, 7 hours; distance, 15 miles.

"9. 15. Proceeded along a narrow ascending path in thick jungle.—4. 45. Halted on the *May-Koung*[65], wide 30, deep 1½ feet, pebbly bed, a short way from *Kanoo*[66], a Careen village. The march to-day has been over a succession of hills, some of which were nearly perpendicular, and I should think almost impassable for a loaded bullock, though the elephants have travelled with ease. The path is well shaded, and there is abundance of water: indeed the jungle has generally been so thick that we could only see a little of the path before us, and a ravine or a hill close to the road; the march on the whole was less disagreeable than yesterday, having been more on the hills. Between 10. 20, and 10. 40, passed a hill, on which there are a great many lofty cinnamon trees, the only ones known by the Careens to exist on any of the hills, and are not at all prized by them; the bank is about two inches thick, and of good flavour, when fresh, but acquires a bitter taste when dry. Passed some immense trees, called by the Burmans *Couck-Moo*[67], of which the canoes are made; said to be large enough to make a canoe for 5 or 600 baskets of paddy.

"*22nd.* Direction South, 40 West. Time, 2 hours, 30 minutes; distance, 7 miles.

"9. Path pretty level; jungle extremely close.—9. 20. Along the bed of the *May-Koung*, pebbly with large rolled mosses overhung by rocks 1 or 200 feet high.—10. Jack trees; said to be the site of an old city.—11. 30. Halted in a thick jungle with some betel-nut trees on the western bank of the *May-Koung*. March nearly of the same character as the last two days, but the hills less steep.

"*23rd.* Direction South, 55 West. Time, 8 hours; distance, 17 miles.

"8. 4. Ascended.—9. 10. Wound up the face of an extremely steep hill from east to west, in a southern direction; and at 9. 20 ascended along the brow of the hill.—11. 40. Crossed the *May-Tia*[68], and proceeded along a ravine. —1. Recrossed the *Tia*.—4. 45. Halted on the east bank of the *May-Gnow*, wide 90 or 100 feet, running north, 20 west. The hills to-day, with the exception of those on the 21st, were as steep as any we have crossed; and our progress slow and difficult; some of the highest hills to-day had been cleared for paddy, and the ground is said to be productive. Met a *Zimmay* slave merchant returning by the route; he had six slaves, three of whom are about five years of age, for each of whom he gave four bullocks.

"*24th.* We have been obliged to halt to-day till the old road between *Martaban*, and this, which has grown up from disuse, be a little cleared by the Careens for the next two marches, when it again joins the route followed by us in our march up one day from the *Thaung-Ein*.

"*25th.* Direction North, 80 West. Time, 2 hours, 30 minutes; distance, 7 miles and 4 furlongs.

"9. 45. Crossed the *May-Gnow* several times along a level road. At 10 passed a small Careen village, and left the *May-Gnow* to the northward. The Careens had cleared the path through long grass, along the banks and in the bed of the *May-Satang*[69], a small stream of a few inches deep. At 10. 15 halted on the banks of the *May-Satang*, in thick jungle with wild plantains. The path to-day has been nearly level down the course and across the valley of the *May-Gnow*.

"*26th.* Direction North, 65 West. Time, 3 hours; distance, 7 miles.

"9. 30. Proceeded along a pretty good path, crossing the *May-Satang*.—10. 45. Descended and crossed the *May-Satang*, the last time.—11. 40. Side of the hills less steep to-day than some parts of our march, but path very narrow on the brink of a precipice.—12. 30. Halted on the brow of the hill. The road which we have come to-day will be good when more frequented. Except a very steep hill at the beginning of the march, the Careens declare there is no better path through these hills. A considerable part of the march to-day was through an old paddy hill on which the trees had not yet acquired any size, and many of the other hills had been cultivated to their summits within the last year or two. The Careens in this part of the hills must, of course, be pretty numerous.

"*27th.* Direction South, 70 West. Time, 5 hours, 13 minutes; distance, 11 miles, 6 furlongs.

"9. 10. Started, and crossed several hills, or rather heights, on the hills.—2. Came on the paths we travelled on the way up.—2. 25. Halted at our former halting place on the banks of the *Seindzoy-Keum*[70]. The path to-day has been good for elephants, and very passable for bullocks.

"*28th.* Direction South. Time, 6 hours, 40 minutes; distance, 12 miles.

"9. Crossed the *Seindzoy*, and proceeded along the path pursued on our way up.—1. Passed our old halting place on the *May-tha-woe*[71].—3. 40. Halted at our former halting place on the banks of the *Thaung-Ein*[72].

"The first half the march to-day, which was extremely distressing to the elephants from the steepness of the hills, was performed in two hours and a half on our march up, and took us four hours to-day. The last half of the march was more level along the little valley of the *May-thoe-woe*, which we crossed 8 or 10 times, and was performed in very little (10 minutes) more time than we took in the way up.

"*March 1st.* Halted to-day on the banks of the *Thaung-Ein*. To-morrow I shall proceed alone, and the Shans will wait for the remainder of the cattle on their own side of the river. The golden sword-bearer is to accompany me one march with four elephants.

"*2nd.* Direction South, 20 West. Time, 4 hours, 5 minutes; distance, 12 miles.

"10. Crossed the *Thaung-Ein* at an elephant's ford about ¼ of a mile above where we crossed before.—12. 10. Passed *Ween-Wee*[73], our old halting place.

"3. 5. Halted on the old ground at the top of the waterfall[74].

"The path for much the longer proportion of this march was good and perfectly level; the elephants consequently proceeding rapidly, and were up with the people.

"*3rd.* Direction South, 20 West. Time, 4 hours, 20 minutes; distance, 10 miles.

"10. 20. Descended the waterfall.—1. 15. Reached the *Yum-byue*[75] river. —2. 45. Crossed the end of the *Yum-byue* path, by which we marched on our way up, and halted on the beginning of the *Dagyue*[76] path, near our former halting place.

"The descent of the waterfall was less difficult than I had anticipated. The bullocks left *Ween-Wee* this morning, and were up a short time after us. The road on this side of the *Thaung-Ein*, though still amongst the hills, is less mountainous than we have travelled between *Mein-Woot* and that river.

"*4th.* Direction South, 45 West. Time, 2 hours, 45 minutes; distance, 7 miles, 4 furlongs.

"9. Crossed the *Mian-Koung*[77], the path good but narrow, from not having been cut by the Careens.

"9. 45. The whole jungle of short bamboos intersected in all directions with elephants' tracks.—12. 30. Crossed the *Chline-Boye*[78] river, now with only a few inches water, but the bed of the river is 80 or 100 feet wide, with deep banks, probably 18 or 20 feet.—1. 10. Halted on the north bank of the *Kwee--Keung*[79] or buffaloe stream, 10 or 12 feet wide, running to the westward. The path to-day was particularly good and level, but not cleared for a few miles. Some of the people saw to-day a herd of 20 or 30 elephants, amongst which there were *several* males, and some young ones.

"*5th.* Direction South, 45 West. Time, 2 hours, 45 minutes; distance, 7 miles, 4 furlongs.

"9. Crossed the buffaloe stream and marched along a good level path.—11. Halted on the banks of the *Ou-ko*[80], after searching half an hour in vain for a path; the Careens who were sent for this morning at daylight have not yet arrived. The path to-day good, open and level, and, as yesterday, much intersected by elephants' tracks.

"This part of the country was formerly inhabited by the *Lowa-Talines*[81], and the places still bear *Lowa* names; the same race extended to the *Moy-Toum*, before the country was devastated by the Burmans, whose blood-thirsty rapacity has depopulated the whole of this part of the ancient Taline kingdom.

"*6th.* Direction South, 30 West. Time, 4 hours, 15 minutes; distance, 12 miles, 2 furlongs.

"8. 30. Good path through open jungle and long grass.—11. Remains of Careen villages.—11. 20. Plains of considerable extent; marks of wild cattle. —12. 25. Halted in consequence of the jungle in advance being on fire.— 1. 40. Proceeded, and at 2 halted on the south-western bank of the *Chline-Boye* (which falls in the *Gyne*[82], a short distance in a South 70 East direction from this.) Such is the level nature of the country that some of the stream runs into the *Chline-Boye* in the beginning of the rains, and out of it after they have fairly set in. The bed of the *Chline-Boye*, which rises 20 or 25 feet in the rains, is here 80 or 100 feet wide, the water about knee-deep in some places, in others of greater depth, and frequented by alligators; and that of the *Chline-putty* about 30 wide and 25 deep: they were both choked up with fallen trees, and the latter dry at this season.

"The march to-day has been through a level country; the jungle open with long grass, and four or five small plains covered with small bamboos much cut up by the jungle cattle. Elephants' tracks still intersecting in all directions. Saw some rhinoceros' marks to-day; their feet are smaller than the elephants, toes more apart, and the nails longer;—sent off two sick people to proceed down the *Ghine* in boats, under charge of the head Careen.

"*7th.* Direction South, 20 East. Time, 2 hours, 30 minutes; distance, 7 miles.

"8. 30. Proceeded along a good path and level.—9. 30. Plain with long grass. At 10. 45 large plain and paddy stubble covered with upwards of two hundred buffaloes belonging to the Careen village of twenty-eight or thirty houses called *Twine-woot* or *Twine-bot.*—11. Halted at the end of a plain.

"*8th.* Direction South, 35 West. Time, 2 hours, 20 minutes; distance, 10 miles.

"10. 10. Proceeded along the level path, through a country of the same character as yesterday.—2. Bed of the *Tham-bou*[83] river.—2. 30. Halted at a broken bridge over the *Atsong*[84] river on the high road from *Martaban* to the town of *Gyne*, about ten miles from *Gyne*, and at an equal distance from *Domitha*[85], and within sound of the evening gun of *Maulamyne.* The town of *Gyne* was destroyed in a revolt of the Talines about twenty years ago.

"The road to-day good and level; very beautiful plains, less water than usual, but plenty for cattle and passengers.

"*9th.* Direction South, 20 West. Time, 6 hours; distance, 17 miles.

"8. 10. Route continues through level grassy plain with occasional patches of jungle.—11. 11. Paddy stubble.—2. 10. Halted near the *Thaung-thoo* village of *Naung-laung*[86], containing about thirty houses, and probably about 200 inhabitants: found here a body of about one hundred of the annual caravans of the *Shan-Gaung-bee*[87] Shans, who have been nearly four months on the road from their own country in the north. The road to-day level, and generally free from jungle, through plains of fine long grass. The path has been extremely tortuous, and for the last two hours most unnecessarily winding in all manner of directions through a plain of short grass or paddy stubble. The whole of the plains in this neighbourhood are covered with rich green grass, enough for the subsistence of an immense number of cattle throughout the dry season. The waters of the monsoon recede very late from this part of the country, and at that season boats pole across this plain to *Yam-soline*[88], and from thence up the creeks to *Shewe-Ghin*[89], and *Toungoo*[90].

"The path along the plain was much exposed to the sun, and many of the Talines, who suffer more from the sun than the natives of India, were ten hours on the march.

"*10th.* Direction North, 20 East. Time, 8 hours; distance, 26 miles.

"7. 15. Marched along the continuation of the plain till 1. 45, when we halted a few hours at *Dzadi-been*[91].—6. 30. From this proceeded in boats to *Maulamyne*, where we arrived at 9. 20 P. M.

[*To be continued.*]

II.—*Outline of Political and Commercial Relations with the Native States on the Eastern and Western Coasts, Malay Peninsula**. *By* T. J. Newbold, *Lieut., A. D. C. to Brigadier General* Wilson, *C. B.*

Note.—It will be convenient to preface, that the subjoined outline follows the geographical order of the States on both coasts of the peninsula; commencing on the north-west with *Quédah,* and proceeding southerly down the Straits of *Malacca* to *Point Romania*—thence turning northerly along the eastern coast up to *Patáni.*

The following is the order of the States, with their supposed boundaries and estimate of population, chiefly derived from native sources in 1835.

Quédah†—from the *Trang* river, in 7° 20′ N. to the *Krian,* 5° 10′ N. Population 50,000.

Pérak—from the *Krian* to the *Rúnkúp,* in about 3° 59′ N. Population 35,000.

Salangóre—from the *Rúnkúp* to the *Lingie,* in about 2° 35′ N. Population 12,000.

Malacca—(British territory,) from the *Lingie* to the *Cassang.* Population, (1833-1834,) 34,333.

Johóre—from the *Cassang* to the *Sedilly,* on the East coast, 2° 15′ N. Population 25,000.

Paháng—from the *Sedilly* to the *Kemámang,* in 4° 15′ N. Population 40,000.

Kemámang—is situated a mile or two up the river, little or no territory along the coast. Population 1,000.

Tringánu—from the *Kemámang* to the *Basut.* Population 30,000.

Calántan—from the *Basut* to the *Barúna.* Population 50,000.

Patáni—from the *Barúna* to *Tana,* in 7° 20′ N. Population 54,000.

The population of *Pinang* in 1833 amounted to 40,322,—that of Province Wellesley to 49,553,—and that of *Singapore,* in 1834, to 26,329.

Quédah, Ligóre, Patáni, Merdilous, Junk Ceylon.—The upper states of the peninsula, viz. *Quédah, Ligóre, Patáni, Merdilous,* and the island of *Junk Ceylon,* are considered in the treaty concluded by Major Burney, with *Siam,* in 1826, as provinces of that empire,—a concession to that arrogant power, scarcely just or politic.

Quédah.—Our relations with the latter four states are merely of a commercial nature,—an unrestricted trade with the ports of *Singapore, Malacca,* and *Pinang.* With regard to *Quédah,* it is stipulated in the above treaty, that the Siamese shall take proper care of that country and its people, and that they shall remain there: the inhabitants of *Pinang* and *Quédah* enjoying mutual trade and intercourse as before. The Siamese engaged not to levy any duty upon stock and provisions; such as cattle, buffaloes, poultry, fish, paddy, and rice, which the inhabitants of *Pinang,* or ships there, might have occasion to purchase in *Quédah:* and the Siamese should not farm the mouths of rivers or any streams in *Quédah*, but should levy fair and proper import and export duties.

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* This paper, though rather more of a political nature than is suitable to a Scientific Journal, cannot be refused publication, as it forms the wind-up to the valuable series of notices of the Malacca States already printed in our pages.—Ed.

† It must be borne in mind, that a tract of the *Quédah* coast, called Province Wellesley, about 35 miles long by 4 broad, extending from the *embouchúre* of the *Múda* to that of the *Krian* river, is under the *Pinang* Government.

The English engaged to the Siamese not only that they would not attack nor disturb *Quédah*, but that they would not permit its deposed sovereign or any of his followers to attack, disturb, or injure in any manner the territory of *Quédah* or any other territory subject to *Siam*. They also engaged that they would make arrangements for the ex-king of *Quédah* to go and live in some other country*, and not at *Pinang* or *Pryc*, or in *Perák, Salangóre*, or any Burmese country. In case the ex-king did not remove, the Siamese were at liberty to levy the export duty upon paddy and rice in *Quédah*.

With Quédah for Pulo-Pinang or Prince-of-Wales Island.—*Pulo-Pinang* was formally ceded to the British on the 12th September, 1786, for the annual sum of 6,000 Spanish dollars, by the father of the present ex-king of *Quédah*, through the agency of Mr. Light, to whom it had been presented the preceding year as a marriage portion with the Malay king's daughter.

In 1802, Sir George Leith finally arranged that the English Company should pay annually to His Majesty of *Purlis* and *Quédah* 10,000 Spanish dollars, as long as the English should continue in possession of *Púlo-Pinang* and *Province Wellesley*. This last is the line of coast, on the opposite shore, on the main, that lies between the river side of *Qualla Múda* on the north and *Qualla Krian* on the south; measuring inland from the sea side 60 orlongs.

The Company are bound to protect this coast from all enemies, robbers and pirates that may attack it by sea from north or south.

The treaty consists of fourteen articles, and terminates with the following remarkable paragraph. "These fourteen articles being settled and concluded between his Majesty and the English Company, the countries of *Purlis* and *Quédah* and *Pulo-Pinang* shall be as one country; and whoever shall depart or deviate from any part of this agreement, the Almighty punish and destroy him; he shall not prosper."

Pinang was formed into a regular government in 1805.

Pérak.—*Pérak* is the next state, on the west coast, south of *Quédah*. A notice of its relations has been already given.

Salangóre.—A treaty of commercial alliance, precisely similar to that entered into with *Pérak*, was concluded with *Salangóre* in 1818 by the British Commissioner, Mr. Cracroft.

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* He resided and drew his pension in *Malacca* till the close of 1835, when he left it ostensibly for *Delli* in *Sumatra*.

By Major Burney's treaty with *Siam*, 1826, the British are bound not to allow the State of *Salangóre* to attack and disturb that of *Pérak*. The Siamese are likewise bound by the same treaty not to go and attack or disturb *Salangóre*. In 1786 the Dutch dictated a treaty to the then Rája (Ibrahim), by which the latter was compelled to acknowledge the sovereignty of the Dutch, who were then in possession of *Malacca*, and to hold his kingdom from them as a fief. In 1818 the Dutch wished to renew this treaty, but the *Salangóre* chief refused, relying on his newly acquired relations* with the British.

Johóre for the occupation of the island of Singapore.—In 1818 a commercial treaty was entered into, by the then Resident at *Malacca*, Major Farquhar, with the monarch of *Johóre*, who was acknowledged by the Dutch; viz. *Sri Sultán* Abdurrahmán Sháh. Since that time, however, the elder brother of this prince was set up and acknowledged by British policy as being the rightful successor, and in order to obtain a legal title to the island of *Singapore*, which, as will be shewn, was ceded to the Company by the latter. By Major Farquhar's treaty with Abdurrahma'n Sha'h, mutual liberty of navigation and commerce in the ports and dominions of *Johóre, Paháng, Lingin, Rhio,* &c. was secured to British subjects, or persons under the protection of the Company, on the footing of subjects of the most favored nations; the subjects of *Johóre* enjoying similar advantages and privileges in the harbour of Fort Cornwallis, and in all other places dependent on the British Government of *Pinang*.

Sir Stamford Raffles, in a letter to Sir Robert H. Inglis, states that the Dutch no sooner obtained possession of *Malacca*, (in September, 1818, the month after Major Farquhar's treaty with Abdurrahmán Sháh had been concluded,) than, notwithstanding our treaties, which had been publicly communicated for their information on the cession of *Malacca*, they sent an overpowering force to *Rhio*, where Abdurrahmán resided; declared the chief to be their vassal, treated our negotiations with him contemptuously, and dictated a treaty which excluded the British trade from the port, &c.

In consequence partly of the delivering up of a place, so advantageously situated as *Malacca*, to *Holland*, it was deemed politic by the Marquis of Hastings, in order to protect the British trade, and to secure one of the two passages to the Eastern Archipelago and *China*, to attempt the improvement of our relations with *Achín* at the northern entrance, and to form a settlement at *Rhio*, an island advantageously situated near the southern extremity. For these and other political purposes, Sir STAMFORD RAFFLES was appointed and associated with the Resident at *Malacca*, Major FARQUHAR, by his Lordship, and proceeded on his mission from Bengal in December 1818.

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* *Salangóre*, formerly renowned for its warlike and enterprizing colony of *Bugis*, has dwindled into a weak, piratical state. They were apprehending and preparing for an attack from *Siac* in the middle of last year. The present chief is not remarkable for talent or enterprise. His name is Sultán Mahomed.

On arriving in the Straits he found *Malacca* and *Rhio* in the hands of the Dutch, as already alluded to;—consequently, *Holland* at this time held in her hands the keys of both those gates to the China Seas, the Straits of *Malacca* and *Sunda*.

The *Carimon* isles and that of *Singapore* were almost the only eligible spots now left. The latter, with the concurrence of Major FARQUHAR, and, some say, at the suggestion of Captain Ross, was judiciously selected by Sir STAMFORD, and the British flag there hoisted on the 29th February, 1819. The new settlement was placed in charge of Major FARQUHAR; who, from his great popularity among the Malays, and local experience, was admirably fitted for the office.

It appears that Sir STAMFORD when off *Singapore* was visited by the *Tumungóng* of *Johóre*, a chief inimical to the interests of Holland, and by no means friendly to the claims of the Sultan newly elected by the Dutch, ABDURRAHMÁN SHA'H, with whom a reluctant and exclusive treaty, as far as regarded the commerce of other European powers, had been concluded by Dutch agents at *Rhio*, which gave them possession of that island. The *Tumungóng* represented to Sir STAMFORD, that the British were still at liberty to establish themselves on the island of *Singapore* under the sanction of the legitimate sovereign, whom he considered to be the elder brother, HUSSAIN MAHOMED SHA'H, whose lawful claims had been set aside by the Dutch in favor of those of his younger brother, ABDURRAHMÁN SHÁH, with whom they had concluded the arbitrary treaty already mentioned.

As the recognition of HUSSAIN SHA'H as lawful sovereign of *Johóre* was a necessary preliminary to treating with him, he was now invited over from *Rhio* to *Singapore* by the British Commissioners, and being acknowledged by the two hereditary elective officers of the empire, viz. the *Bandahára* of *Paháng* and the *Tumungóng* of *Johóre* as their lawful chief, was recognized and treated with as the legal sovereign by the Commissioners; who forthwith entered into arrangements for the immediate occupation of the port and the establishment of a settlement at *Singapore*, pending a reference to the Supreme Government.

By the arrangement with HUSSAIN SHÁH, of the 26th June, 1819, which appears to have been rather loosely drawn up, it was decided that the British jurisdiction should extend only over a limited part of the island; viz.—from *Tánjong Mallang* on the west, to *Tanjong*

Kattang on the east; and interiorly as far as cannon-shot range all round the factory. The council for the government of the island to be composed of the British Resident, the *Sultan* and the *Tumungong.*

This state of affairs continued with little alteration until 1824, when final arrangements for the entire cession of the island to the British were made, and a treaty of friendship and alliance concluded by the then Resident, Mr. Crawfurd, on the part of the Company, with their highnesses the *Sultan* and *Tumungong* of *Johóre*. This took place on the 2nd of August. By it the island of *Singapore,* together with the adjacent seas, straits and islets to the extent of ten geographical miles from the coast of *Singapore,* were given up in full sovereignty and property to the East India Company, their heirs and successors for ever.

The Company agreed, in consideration of this cession, to pay to the *Sultan* the sum of 33,200 Spanish dollars, together with a stipend during his natural life of 1,300 Spanish dollars per mensem; and to the *Tumungong* the sum of 26,800 Spanish dollars, with a monthly stipend of 700 Spanish dollars during his natural life.

In event of the *Sultan* and the *Tumungong,* their heirs or successors, preferring to reside permanently in any portion of their own estates, and to remove for that purpose from *Singapore,* the Company agreed to pay the *Sultan,* his heirs or successors, the sum of 10,000 Spanish dollars; and to the *Tumungong,* his heir or successor, the sum of 15,000 Spanish dollars. The *Sultan* and the *Tumungong,* in return, relinquishing for themselves, their heirs and successors, to the Company, their heirs, &c. for ever, all right and title to every description of immovable property, whether in land, gardens, houses, &c. of which they might be possessed within the island or its dependencies at the time of their withdrawal from *Singapore,* for the purpose of residing permanently within their own states.

It was also mutually stipulated, that neither party should be bound to interfere in the internal concerns of the other Government, or in any political dissensions or wars which might arise within their respective territories, nor to support each other by force of arms against any third party whatsoever. The *Sultan* and *Tumungong* bound themselves that, as long as they continued to reside within the island of *Singapore,* or drew their respective monthly stipends from the Company, they would not enter into any alliance, nor maintain correspondence with any foreign power or potentate without the knowledge and consent of the Company, its heirs, &c.; to maintain a free and unshackled trade every where within their dominions, and to admit the trade and traffic of the British nation into all the ports and harbours of the kingdom of *Johóre* and its dependencies on the terms of the most fovored nations. Such are the conditions under which the British hold *Singapore* from the *Sultán* of *Johóre.*

Paháng.—Paháng, though virtually independent, is nominally a dependency of *Johóre;* governed by one of its elective officers, the *Bandahára.* It has consequently been included in the relations with that state.

Tringánu and Calantan.—By the 12th article of Major Burney's treaty it is stipulated, that *Siam* shall not go and obstruct or interrupt commerce in the states of *Tringánu* and *Calantan.* English merchants and subjects shall have trade and intercourse in future with the same facility and freedom as they have heretofore had; and the English shall not go and molest, attack or disturb those States upon any pretence whatever.

Patáni.—Patáni has already been adverted to as having become a province of *Siam,* on which empire it borders.

Present condition of the Malay States.—Having thus traversed both the eastern and western coast of the Peninsula, I will briefly advert to the political condition of the Malay States as it existed at the time of my quitting the Straits in 1835. The Siamese retained, in spite of their struggles, firm hold of *Quédah* and *Patáni,* which are still groaning under the yoke. The rightful Rája of *Patáni* remained a close prisoner in *Siam,* and his country in a state of depopulation and distress under a Siamese governor. *Tringánu* and *Calántan,* being less under the withering influence of the monarch of the White Elephant, are in a more prosperous condition, carrying on a considerable trade with *Singapore* under their own princes. Both *Tringánu* and *Calántan* have been lately menaced by *Siam,* in violation of their treaty with the British, by which they are interdicted from interfering with these States.—*Kemámang* is a small state, lying between *Tringánu* and *Paháng:* of the former it is nominally a tributary, but bears a *mala fama* on the score of piracy,—a practice said to be countenanced by its chief. The pirates are chiefly tempted by the prows trading from *Patáni, Calántan* and *Tringánu* to the port of *Singapore. Paháng* was in a peaceable and flourishing state under its *Bandahára,* carrying on a profitable trade with *Singapore,* chiefly in gold-dust. The shores of *Johóre,* though nominally the possessions of our stipendiary the Sultan, are miserably neglected; the creeks, bays, islets, and rivers of this extensive tract affording safe shelter to the hordes of pirates that threaten to extirpate the native commerce of *Singapore.* The states in the interior of *Malacca* were, by the last accounts, still in anarchy and confusion, arising from the fierce feuds and broils which have for some years past been raging among the native chiefs. *Salangóre* was labouring under serious apprehensions of an attack from *Siac* on the opposite coast of *Sumatra*, the chief of which was said to be collecting a fleet of *práhus* for that purpose. The Rája of *Salangóre* was employed in repairing his fort, and remounting the numerous guns that lay scattered on and around the hill on which the fort stands. *Pérak* was quiet, and occupied in agriculture and the tin trade. Our old ally, the ex-king of *Quédah*, and the Sultan of *Johóre* were living on their handsome pensions at *Malacca*. The latter has since died (September 2nd, . 835). Near the close of 1835 no steps had been taken with regard to the succession. According to treaty, the pension was to expire with the Sultan; but out of consideration to his widow and children, an allowance of 100 Spanish dollars per mensem has been granted her by the Straits Government, pending a reference to Bengal.

The late Sultan first married with the present *Bandahára* of *Paháng's* daughter; by whom he has no issue. By his second wife, the present *Tumúngong* of *Singapore's* sister, he had a son, surnamed *Tuanku besár*, who married one of the *Tumúngong's* daughters, but died without issue. His third wife was a woman of low birth, by whom he has a son now living at *Singapore*, named Abdal Jalil. He is about 21 years of age. Not being of noble blood by his mother's side, his claims to the succession are not considered good by the Malays. By the fourth and present wife, who is of royal extraction, he has two sons, fine lads,—and two girls: they reside with their mother at *Malacca*. The eldest of the boys is considered the late Sultan's heir.

The ex-king of *Quédah*, I believe, left *Malacca* towards the end of 1835 for *Delli* in *Sumatra*. He had, in 1833, expressed to me his determination of doing so, being disgusted at the answers given to his earnest and repeated applications for redress against the Siamese, and to his request for permission to reside at *Pinang*, which had then been recently refused by Lord William Bentinck. He said that he had many friends at *Delli*, and hinted at the possibility of his making a final attempt to expel, with their assistance, the Siamese from his dominions. *Pérak* and the whole Malay population of *Quédah*, and probably that of *Patáni*, are greatly under his influence; and it would require but little persuasion to excite the whole of the neighbouring Malayan States to take up arms against their haughty oppressors.

With regard to British influence over the Malay States, it might unquestionably be much greater than it is; and indeed we might possess almost sovereign power over the whole peninsula, were we only to exert the political means already under our control. Of later days the fashion has been to treat with them as independent powers; while the chiefs themselves, from a combination of circumstances too long for detail here, are for the most part with difficulty and unwillingly brought to consider themselves so.

Experience has shewn the necessity of the existence of a predominating power, capable and willing to afford effectual mediation, to which these divided States may look up in their frequent disputes.

The Dutch during their ascendancy were fully alive to, and took every advantage of, the influence their commanding position gave them; as the numberless treaties concluded with almost every petty chief on the peninsula and in the Archipelago fully evince: but, by a series of tyrannical and impolitic acts, more particularly the disgraceful system of forced labour, they alienated the affections of a generous race of men, and lost, as a natural consequence, the fruits of their able, though selfish negotiations and political alliances. Britain now occupies a prouder situation with regard to these Eastern States than Holland ever did. Two princes, representatives of the two most noble dynasties, *Quédah* and *Johóre*, derive a handsome subsistence from British bounty. British colonies occupy, and carry on an extensive commerce from the site of those two ancient seats of Malayan empire, *Malacca* and *Singapore;* while British ships retain undisputed possession of the seas. It alone remains for a wise and liberal Government to consolidate and uphold the moral influence of public opinion,—that extraordinary talisman by which is held together the greatest of colonial empires. In the face of such considerations, deterred by the fallacious theories of non-intervention and non-territorial extension, we are incurring the heavy moral responsibility of permitting so great an extent of power, delegated, no doubt, for philanthropic and humane purposes, to lie inert,—a power which, if wielded with discretion, would not only strengthen our political and commercial relations in this part of the globe, but effect the decided amelioration, and, eventually, the radical extirpation of the evils under which these oppressed States now groan.

The absence of the strong hand of power, guided by the dictates of humanity and common sense, to settle the endless feuds of the native chiefs, which are too often excited and supported by the criminal cupidity of native merchants and others residing under our authority (as in the case of the late massacre at *Lúkút*, and the disturbances still prevailing at *Lingie*); the morbid dread of intervention, exemplified in our late treaties, and in our systematical non-support of the native established sovereigns in just authority over their rebellious vassals; the worse than uselessness of British law, applied to a state of society for which it was never framed, are, it is my firm conviction, the remote causes of the present system of piracy now prevailing; of the numerous unpunished murders and outrages which disgrace not only the territories of Malayan chiefs, but also territories lying nominally under the protection of the British flag; and of the impoverished and disorganized condition of the Malays in general.

The resources of the soil have been almost hermetically sealed to the occupier by the frequent and protracted feuds already alluded to. Hence the peasant, driven from his village and lawful means of subsistence, and tempted by the smooth seas, the favorable navigation and shelter from pursuit afforded by the unexplored rivers, creeks, and numerous islets of the Straits, and by the charms of a life so congenial to the free and restless spirit of a Malay, is induced to scour the water for a precarious subsistence by fishing or plunder, or by both, as opportunity chance to present[*].

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[*] The *práhus* used by Malay pirates are from eight to ten tons burthen, extremely well manned and remarkably fast, particularly with the paddles commonly used. They are generally armed with swivels on their bows, centre, and stern, of small calibre, but long range. When preparing to attack, strong bulwarks of wood called *Apilans* are erected, behind which the crew ensconce themselves, fighting with their long guns until their prey is disabled; or till the *gong* sound the signal for boarding. But what they mainly depend upon for safety and success is their skill in paddling, (Malay pirates scarcely ever attack except during the lull between the land and sea breeze, or in a calm,) the swiftness of their boats, and their knowledge of the intricate channels between the islands, or over the bars of the rivers into which they generally contrive to escape, baffling their pursuers, and often leaving them aground on one of the numerous shoals or mud-banks which their own superior knowledge enables them to avoid.

The *práhus* of the *Súlú* and *Illánún* pirates are much larger and better equipped than those which commonly infest the Straits. The Malay pirates make their attacks and move in small fleets of from six to twenty *práhus*.

During the months of October, November, December, and January, they will be found cruizing up and down the west coast of the peninsula and the opposite shore of *Sumatra*. From June to the end of September, they are often to be seen among the islets south of *Singapore*, and in the creeks and rivers of the *Johóre* coast. February, March and April are spent in fishing, collecting sea-weed, and preparing for future piratical expeditions.

The crews are armed with boarding spears (some of very great length), *krisses*, Malay hatchets and swords (the *parang* and *kleywang*), muskets, blunderbusses, and a variety of missiles, such as sticks pointed and burnt at the end, stones, &c.

[†] The most noted haunts for pirates on the western coast of the peninsula (according to information derived from a Malay of *Salangore*, who had in his

I conclude with a few suggestions touching the suppression of piracy now existing to so alarming an extent in the Straits. Its remote causes, I have already remarked, are alone to be removed by the adoption of a more enlightened policy towards the native powers; and, it may be added, by the gradual spread of civilization and diffusion of useful knowledge.

1st. The employment of one or more small armed steamers, together with eight or ten large boats, of the fastest possible construction, (particularly for rowing;) manned *fully* with Europeans, and well armed for both close and distant fight.

2nd. A discreet *surveillance* over the conduct of the present *Tumungong* of *Johóre*; who is more than suspected of being the mainspring of the daring system of piracy which has so long been an opprobrium to the eastern extremity of the Straits. A threat of withdrawing the stipend he enjoys gratuitously from the British Government might be useful.

3rd. A careful survey of both coasts of the peninsula, the unexplored rivers, creeks and islets. This, in addition to other obvious advantages, will afford opportunities of observing the character and pursuits of the natives inhabiting the sea-shore and banks of rivers, who are always more or less in league with the pirates, and of collecting information of piratical haunts and places of *rendezvous*.

4th. The suspected native chiefs should be peremptorily called upon to lend their assistance and information: particularly the chiefs of *Kemámang*, *Salángore*, *Pérak*, and *Calántan*. And lastly, the cooperation of the Dutch Government should be secured.

III.—*A brief account of* MASU'D, *known by the name of Faríd Shakarganj or Shakarbár. By* MUNSHI' MAHAN LAL.

[Dated Derah Ghází Khán, 10 miles off from the right bank of the Indus, 10th February, 1836.]

When we reached *Rámú*, a village on the left bank of the united streams of the Hyphasis or *Biás*, and Hesudrus or *Satlaj*, about 150

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youth exercised the profession himself) are the *Búnting*, *Aroe*, *Cocab*, *Pisang Dinding* and *Sambilang* isles; those on the *Salangore* coast, and the islets between Cape Rachado and the *Lingie* river. The rivers *Mirbowe*, *Birman*, *Perak*, *Puteh*, *Koroo*, *Múar*, Rio Formosa, or the *Battu Pahat* river, and formerly the *Lingie* river: the Straits of *Calang* and *Dryon*, Point *Románia* and its vicinity, and the *Carmion* isles to the south.

On the eastern coast are the creeks and small rivers of *Johóre* up to *Paháng*; the *Kemámang* river; those of *Tringánu* and *Calántan*, also the islands of *Timoang*, *Pulo Tingie*, *Redang* and *Aor*.

miles S.-W. of *Lodiáná,* we heard that between the two waters of the Hyphasis and Acesines is a town called *Pák Patan.* It was built in ancient days, and is looked upon as a place of devotion, since the body of Shekh Farí'd reposes there. We crossed the river in a small boat, and bent our route to that direction. The road commenced in a fearful forest, and ended in an extensive hard clayey plain, which environs the above town. It is constructed on a precipice, which is 70 feet high from the surface of the land. The houses are small, both of burnt and unburnt bricks, and the bazárs are narrow, containing some poor shops.

In the year 600 Hijrí, or A. D. 1235, the town was celebrated by the name of *Ajwaddhan,* and was governed by a *Jogí* of that name, tributary to the neighbouring Mahomedan chiefs. When Shekh Farí'd (whose original name was Masu'd) after travelling into Asia and Arabia chose his residence in this town, with the power of his piety he persuaded the *Jogí* to believe in the true faith of Muhammad, and changed the name of the town from *Ajwaddhan* to *Pák Patan. Pák* in Persian means holy, and *Patan* in Panjábí signifies ferry, (holy ferry.)

It is added, that after passing some period, the Shekh wished to undertake the *Mujáhedah,* which, I think, imports to labour in defence of the faith, and asked the permission of his *Murshid,* or the guide to salvation, who rests now in the charming place called *Qutab,* about nine miles S.-W. of *Dehlí.* Shekh Qutbuddi'n Bakhtyár, as he is called, answered his pupil Shekh Farí'd to make a "*tai*" or fast for three days. Farí'd did accordingly, and ate nothing for the fixed time. On the eve of the third day some person presented him with a few loaves, which Farí'd ate, thinking that they were sent to him from the invisible world, or "*Ghaib.*" Meanwhile, a crow holding the polluted intestine of some dead animal in his beak came and sat on the bough of a tree. Farí'd, on the very first sight, felt an abhorrence in his heart, and, ejecting the bread which he had eaten a few minutes before, his stomach became quite empty. He told the circumstance to Qutbuddi'n Bakhtyár, his spiritual guide, who replied, that God has bestowed a great favor on him, otherwise this meal would have hurt him. "Go now, Masu'd, and fast three days more." As he had not eaten any thing from six days, he became very weak, and the heat of hunger began to burn his heart. He stretched his hand on the ground, and, taking a bit of clay, put it into his mouth, and found that it tasted like sugar. This was the effect of his pure mouth. The following verse says,

سنگ در دست او گهر گردد   زهر در کام او شکر گردد

Sang dar dast o guhar gardad, Zahar dar kám o shakar gardad.

"Stone in his hand becomes pearl, and poison turns sugar in his mouth."

FARI'D attributed this favor of God to the tricks of man, so he threw it out of his mouth, and fell deeply again into the contemplation of the Omnipresent. At midnight hunger rendered him weaker than before, and he again got some pieces of earth, and after putting them in his mouth discovered that they were as sweet as sugar. The same thought of deceit came again in his memory, and he threw them once more out of his mouth, and engaged again in prayer as before. By the end of the night FARI'D reflected to himself, that the feebleness caused by hunger might render him unable to stir, so he picked up again some bits of clay and they became sugar in his mouth. He thought they might have been sent to him by God, ate them, and broke his fast in the manner he was directed by his guide QUTBUDDI'N. When the sun rose he went to QUTBUDDI'N, who told him, "FARI'D, you did well to break your fast with the sustenance sent to you from the invisible world. Go: you will be sweeter than sugar." Hence he was called "FARI'D SHAKARGANJ SHAKARBÁR," or the treasure of sugar.

Books have been written of the miracles wrought by FARI'D. TUGHLAQ, a man of obscure origin, and the inhabitant of *Abúr,* seven miles from *Pák Patan,* presented him with a load of fuel, and asked nothing for its price. The only petition he made to FARI'D SHAKARGANJ was, to plant him on the throne of *Dehli;* and it happened so by the benediction of SHAKARBÁR. The reign of this person may be remarkable for other things for aught I know; but the large and strong fort he constructed now presents nothing singular to the view except heaps of ruins. It was called *Tughlaqábád,* and is situated six miles south of *Dehlí.*

FARI'D SHAKARGANJ had many followers; one of them was NIZÁMUDDI'N. His body rests in the most handsome place out of *Dehlí.* He was the patron of the famous poet AMI'R KHUSRAU, who, by the Persians, was denominated "*Totíe Hind,*" or the parrot of India, and sleeps on the same charming spot.

The mausoleum of FARI'D SHAKARGANJ is visited by the pilgrims of different quarters. The Hindus of this country believe him to be an inspired man, and pay respect to his monument, like the Musalmáns. After descending a few steps we came into a square laid with bricks, and entered the cupola in which the FARI'D is interred. It is floored with marble slabs, and opens by a door towards the east. On his left hand is the tomb of his son, SHEKH BADRUDDI'N, neither differing in size nor in materials. Over them is a pompous canopy of green brocade tied with string against the roof of the monument. A small window covered with oil and dust is made in the direction of the south. It is called the "*Darwázah Bihisht,*" or the door of Paradise, and is opened every year on the fifth of the month of *Muharram,* which is the death day of that holy man. The people flock on that day, and, pushing each other forward, rush in at the *Darwázah Bihisht,* and come out by the next door. By doing this they have been persuaded to believe, that they shall have the first place in heaven when they depart for the next world. The monument is 20 paces in circumference, and 30 feet high. It was erected by his disciple SHEKH NIZÁMUDDI'N, *Aulíyá,* or the Saint. It is whitened with lime, and has a beautiful appearance when nearly viewed. FARI'D was born in 569 Hijrí, and died of colic in the year 664 H., at the age of 95. The following verse gives the above dates.

رحم فرما شد تولد عابد ازاده عمر
شد فریدالله سال رحلت مسعود عصر

Rahm farmá shud tawallud ábid ázádah umr,
Shud Farídulláh sále rahlate Masúd asar.

The words *Rahm farmá* we should take for the date of his birth, as, (رحم فرما) 1 40 200 80 40 8 200 or 569 Hijrí. The words *A'bid azádah* stand for the year of his age, as (عابد ازاده) 70 + 1 + 2 + 4 + 1 + 7 + 1 + 4 + 5 = 95. *Shud Farídulláh* shews the date of his death as (شدفریدالله) 5 + 30 + 30 + 1 + 4 + 10 + 200 + 80 + 4 + 300 = 664. "*Faríd asri*" or the gem of the time, is another date of his death as (فرید عصری) 10 + 200 + 90 + 70 + 4 + 10 + 200 + 80 = 664 H.

Next to this monument in the same square is another dome built by TUGHLAQ SHÁH. It contains the tomb of SHEKH ALAH-UDDI'N, MOIZZUDDI'N and SHEKH FAZL, &c. &c. the descendants of FARI'D. The height of this dome is nearly 50 feet, and the circumference 36 paces. It is larger than the former, and has a door opening to the south. It looks older, because it has never been repaired. All of the graves were veiled with dust, but a few flowers lying over them showed that they are also occasionally visited by the people. The accompanying is the drawing of the FARI'D's monument, which I have done by the means of a *camera obscura**.

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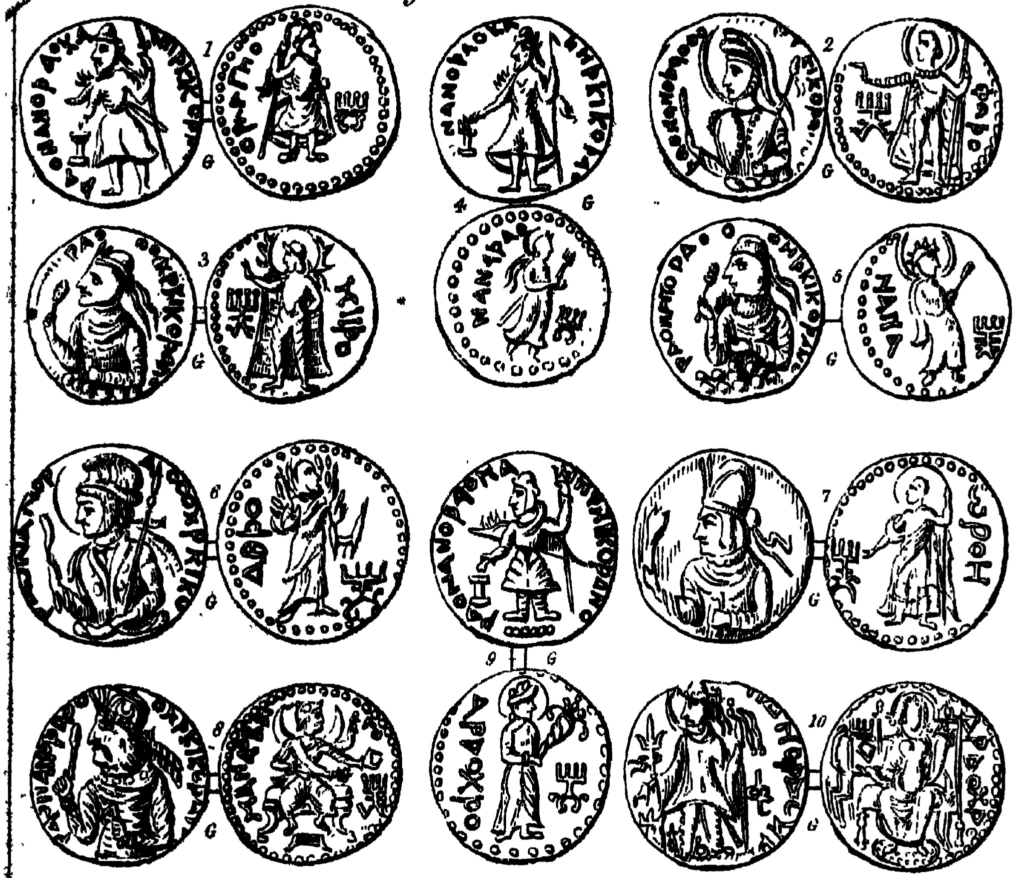
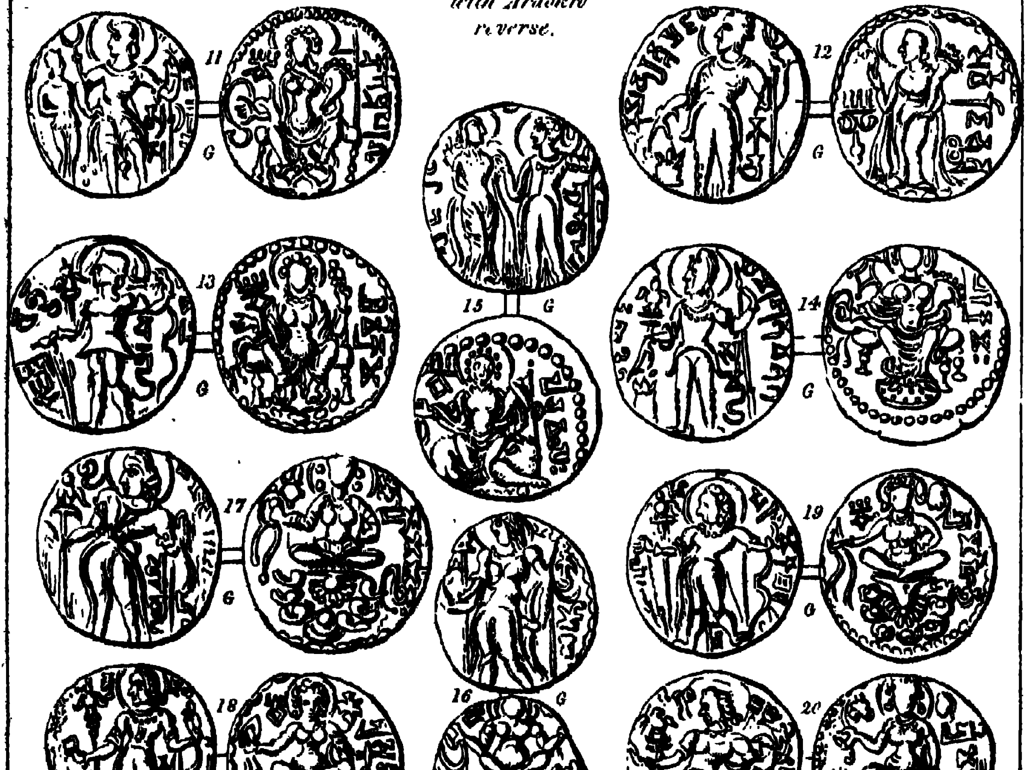
* Our young friend has evidently not yet acquired the knack of the camera obscura (lucida ?). Out of consideration therefore for the memory of Dr. Wollaston, its inventor, we omit his unsuccessful attempt to use it.—ED.

Connection of Mithraic with Hindu Coins.



Hindu Coins. Canouj Series.

with Ardokro
reverse.



IV.—*New varieties of the Mithraic or Indo-Scythic Series of Coins and their Imitations.* By James Prinsep, Sec. As. Soc. &c.

From the variety of the Mithraic reverses already made known, it might have been imagined that the series was nearly exhausted. Every year, however, adds a few new types to our previous list, or produces finer samples of these hitherto considered indistinct. So multiplied, indeed, are our resources at the present time, that we can afford to be fastidious, and not only reject coins of the baser metals, but limit the admission even of golden novelties to those of one size, weight and value!

My object in Plate XXXVI. is to develope more fully the transition from the Mithraic or Indo-Scythic coinage to the Hindu series, for which my numerous friends have furnished even more unequivocal links than those engraved in my former Plate, (XXXVIII. of Vol. IV.) I must begin, however, with a few novelties of the true Mithra type.

Fig. 1 is the first to rivet our attention and curiosity. It is an unique of Mr. Masson's discovery. The *obverse* has the usual standing figure of the Rája sacrificing, with the legend PAO NANO PAO KANHPKI KOPANO. The *reverse* has an armed figure, nearly the counterpart of the other, but without any altar, and with the usual monogram: the legend being in Masson's drawing, OPAAΓNO. Not having the coin itself before me, the reading I venture to substitute for this, is of course liable to correction; but the strong similitude between the commencement of this legend and of the two curious ones formerly noticed, namely, APΔOXPO and APΔHΘPO, leave little doubt in my mind that the one before us should be read APΔAΓNO; the word AΓNO representing the Sanscrit अग्नि *Agni*, the god of fire; whom we may reasonably suppose to be substituted or *Athra*, as the Sanscrit अर्क *Arka* has been for *Mithra* in the Indianized designation, OKPO. The Pehlevi affix APΔ *Arda* (generally written APTA by the Greeks) implying 'the great,' bears an evident connection with अर्य *Arya*, a common Sanscrit epithet of the same signification, 'excellent,' or आर्य *A'rya*, holy, venerable; as अर्यमन् *arya-man*, the sun, आर्यावर्त *áryavarta*, the holy land, (India) &c. *Aria* also occurs in combination in Persian names beginning with consonants, as *Ariobarzanes*, king of Armenia,—a derivative from [illegible], the planet Jupiter of the Mithraic system*.

Further search, should these conjectures be well grounded, will probably bring to light coins with the single appellation AΓNO, which [illegible] hitherto been observed.

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* Vaillant Ars. Imp. I. 183

Fig. 2 is misplaced: for the imperfection of the Greek legend on the *obverse*, ought to condemn it to a lower grade in chronological order. All those legends which have the family name of ΚΑΝΗΡΚΙ are clear and better formed than those of ΟΟΗΡΚΙ to which this coin belongs. The latter, too, have generally the bust of the sovereign substituted for the full length sacrificer. The name on the *reverse* of *fig.* 2, ΦΑΡΟ, is new; nor is it at first very obvious what meaning it may be intended to convey. It cannot well be a corruption of ΑΘΡΟ, because the standing figure faces the opposite way—holds a spear, and wants the flames on his shoulders. Mr. Masson observes on this coin: "Here is another peculiar legend, but evidently signifying the sun as source of light and majesty. *Pharos* was the term applied to the Alexandrian light house, and *Pharoah* is the well known Scriptural title of the old kings of Egypt. The bust on this coin affords a remarkable contrast to other coins of the family." It is certainly probable that the word has some affinity to the Greek φαος, *lumen, dies, solis ortus*, but no more than is naturally found between languages of common origin. The word *Phraa*, or something like it, certainly existed in the ancient language of Persia, as the personification of light or heat—analogous to *Mithra*, the sun*. In compounds it is frequently found, as in *Phraates, Phraortes, Farnaces*, and *Phradates*; the latter being altogether congenerous with *Mithradates*, or as the Greeks translated the name, *Apollodotos*. From the same root are descended the modern Persian verb افروختن to inflame, whence افروز illuminating, so often employed in compounds. Perhaps the uncouth name of *Unad-Pherrou*, on a numerous class of the deteriorated Bactrian coins, may spring from the same root.

Vaillant, however, gives a different and, I think, a less satisfactory etymology of the above class of names in his history of the Arsacidæ. "*Phriapates* seu et *Phrapates*, idem ac *Aphra Pates*, seu et *Papatius*; nam apud Persas idem *Aphra* est, ac *Pa* apud Turcas Scythasque, scilicet elevatus, supremus, maximus, quæ nominibus propriis ut et *art* præponuntur." (Arsac. Imp. I. 2.) Now if the word *aphra* be merely an intensitive preposition, like the Sanscrit पर *para*, the Persian بر *ber*, the Greek παρα, and the Latin *præ* or *per*, the word to which it is affixed should be a significant adjectival noun, as पराक्रमः *parákramas*, the very heroic; اردشير *Ardashir* (Artaxerxes), the great lion, or very valiant, &c. The participial nouns *Mithradates* (quasi مهرداده the given of *Mithra*) and *Phradates* (افراداده the given of *Phra*) require the first member of the compound to be a noun.

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* *Phre* in Egyptian has precisely the same meaning as *mihr* in Persian, 'king, prince.'

Fig. 3. A type familiar to us, in copper—and known before in gold of a smaller size. It was, in fact, one of the two coins first extracted by M. Ventura from the Manikyâla tope. In Mr. Masson's coin the spelling accords with the vernacular pronunciation MIIPO, and the solar glory is irradiated on its edge, to shew more plainly its reference.

Figs. 4 and 5. Two more gold coins of Mr. Masson's collection, having the legend of the reverse respectively NANO PAO and NANA, both proved to be equivalent to NANAIA by the peculiar attitude of the allegorical image. The introduction of PAO in the first of the two would almost seem a mistake of the engraver, who had in his mind the PAO NANO PAO of the obverse. I have nothing to add to my former remarks on the word itself, except to draw attention to an extract from the Armenian Chronicles with which Mr. Avdall has favored us, proving that NANAIA and the Persian ANAHID were not positively identical, each having her separate temples and votaries even in Armenia.

"*Anahid* was the tutelary goddess of our country, and was known equally by the names of Artemis and Aphrodite in our mythological works. She was always considered identical with the planet Venus, though possessing all the attributes of Diana." As *Nanea,* on Mr. Avdall's authority, means *maternal* or *motherly,* it would hardly be proper to ascribe such a designation to the moon, the chaste Diana; neither has her effigy on our coins the lunar emblem, so distinctly portrayed on the MAO and some other types. Rather then let her be constituted the *Venus* of the group, who plays an equally conspicuous part in the Mithraic system*.

Fig. 6. Is a gold coin from M. Court's drawing, of the AΘPO *reverse.* The *obverse* legend is PAO NANO PAO OOHPKI KOPANO.

Fig. 7 is likewise from M. Court's collection. In it I was struck by the strong resemblance of the head-dress to that of the Parthian or Sassanian coins. The legend is wanting, and that of the reverse is quite illegible, though the monogram and device are in a perfect state.

Fig. 8 has been already engraved in my plate of the Manikyâla relics; but as one of the most interesting of the Mithraic series, it could not be denied admission in a plate exclusively devoted to them. I wished further to place it in juxta-position with the sitting figure of the APΔOKPO reverse, because it might be conceived to be the parallel Hindu *lunar* coin to that form of the Hindu *solar* effigy, OKPO.

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* The Baron Hammer says that the word *Neith* of the Egyptians is evidently the same as the Persian *Nahid*—whence also may be traced the German *Nacht* and the English *Night.*

Like OKPO, this figure has four arms, and is therefore Indian: further it is a male divinity; and thirdly, it is identified with MAO, the moon, by the crescents of that luminary arising from its shoulders. It must therefore be *Soma* or *Chandra* of the Hindu pantheon, who is represented with all these characters in MOORE, though a later work by Mr. COLEMAN makes him to be a two-handed divinity.

The appellation MANAOBAΓO, which so puzzled me on the former occasion, has at length, I think, found a satisfactory explanation. *Máng*, مانک in Persian, is an ancient name of the moon,—and *Bhaga* भग in Sancrit, means splendour, glory; and is given as a synonyme of the moon as well as of the sun. In the Zend, then, the link between the Persian and Sanscrit, we may naturally look for a compound of these two terms, such as *manao-bago*. It is well known that the mythology of the Saxons was derived from a Scythic or central-Asiatic source, and their *male* deity MONA (whence our modern term, moon*), has been by the learned referred to the Persian *Mang*. I have, however, found a much more convincing proof than these analogies afford, that such is the correct explanation, in the Baron VON HAMMER's Prize Memoir '*sur le culte de Mithra, son origine, sa nature, et ses mysteres,*' *Paris,* 1833; for a copy of which I am indebted to the learned author's perusal of my observations on the curious relics from the Panjáb.

In the catalogue of Mithraic inscriptions discovered in various parts of Europe, the Baron points attention to one in particular among GRUTER's collection, in which the word MENOTYRANNUS denotes the deified moon:

> "Cette inscription est une des plus interessantes à cause des deux mots de *Menotyrannus* et de Persidicus: le dernier indique l'origine persane du culte de Mithra: le Menotyrannus peut se traduire par, seigneur du mois; mais malgré les objections de M. Rolle contre l'existence du dieu *Lunus*, je crois que cette existence peut trés-bien étre prouvée, non seulement par tous les monumens astronomiques des orientaux modernes, dans lesquels la lune est représentée sous la figure d'un jeune garçon de quatorze ans, mais encore par la coincidence de la mythologie Egyptienne dans laquelle la lune, d'aprés les decouvertes de M. Champollion, est une divinité mâle. Enfin le mot MHN dâns lequel M. Rolle ne voit que le nom d'un mois, est effectivement un nom persan de la lune qui s'appelle *mah* et *mang*: c'est le *moon* des Anglais et le *mond* des allemands, lesquels lui ont conservé son genre oriental."

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* In like manner I feel strongly disposed to connect the strange OAΔO of our coins with *Odin* or *Woden* of the Saxon mythos, an acknowledged derivative from the Sanscrit बुद्ध *Buddha*, Mercury. It is not a little curious that the verbal root of two of our present days of the week, Monday and Wednesday, should thus be discovered among a parcel of old coins dug up in the Panjáb!

After this we can have little hesitation in translating MANAOBAΓO 'lord of the months:'—indeed if we derive BAΓO from the Persian or Scythic بیگ *beg*, 'lord or prince,' we shall have precisely the corresponding term to *tyrannus*.

Fig. 9. A gold coin of Kanerkos from a drawing by M. Court. The *rao* in this seems to have a case for his bow strung behind his back. The *reverse* is similar to that of a fine coin of OOHPKI in General Ventura's series (fig. 9. of Plate XXXVIII. Vol. IV.) which however differs in having the bust in lieu of the full length of the prince. The legend APΔOXO has been before explained as "the great sun*." One of his attributes it may be presumed rather than the god himself, is intended, by the female holding the cornucopia—typifying the fertility he bestows on the earth.

Fig. 10 is a most important acquisition to our Mithraic series, as being the very link of connection between them and the *Canouj* coins. Immediately after the publication of my former plate, Lieut. Cunningham wrote to me from *Benares*, pointing out a coin in his cabinet of the class I had designated links, having the seated female with the cornucopia, but more perfect than those I had engraved, inasmuch as the legend to the left was preserved and legible as APΔOXPO, the same as that of the standing figure. A duplicate of the same coin was also in Colonel Stacy's cabinet, and on reference to the Asiatic Researches, Plate I., the letters of APΔOXPO were clearly legible on the reverse of fig. 6, a gold coin procured by Mr. Wilson from the bed of a tank in the *Húglí* district.

The cornucopia as a device seems to have been copied from the Roman coins of the Emperors. It is seldom or never to be seen on the genuine Greek coins—nor is it found on our Bactrian series until the age of *Azos* (with exception of the copper coins of Antimachus and Philoxenus, the date of which is uncertain). Whether it bears any direct allusion to the legend may be doubted,—at least such allusion is entirely lost sight of the moment we pass the boundary into the Indian series.

Hindu coins imitated from the Ardokro type.

Since my former paper on the *Gupta* coins of *Canouj* appeared, very important acquisitions have been made to our knowledge of this before unknown dynasty, through the medium of coins and of inscriptions; for both of which we are almost entirely beholden to the researches of Lieut. A. Cunningham and Mr. V. Tregear in the neighbourhood of *Benares*.

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* The OPOOKPO of the copper coins may be deemed a still closer imitation of the Sanscrit आर्य्यार्क *Aryárka.* APΔ is the Persian orthography.

The inscription in an ancient character upon the column at *Allahabad* interpreted by Capt. Troyer and Dr. Mill in the 3rd vol. Jour. As. Soc. had made us acquainted with the four first of the family* ; namely, 1, Gupta, a Rája of the solar race: 2, Ghatot Kacha, his son: 3, Chandra-gupta, his son: 4, Samudra-gupta, the fourth in descent:—and there the *Allahabad* record broke off with an intimation that a son was *expected.*

The *Bhitari láth* brought to notice by Messrs. Tregear and Cunningham, fills up the line of succession for three generations further (see Plate XXX. of the present No.). We may so far anticipate the translation of this highly important record promised to us by Dr. Mill, for the illustration of our subject, as to state that the infant of Samudra was named Chandra-gupta II. His son was, 6, Kumara-gupta; after whom followed, 7, Skanda-gupta—and there again this new authority breaks off.

Now to all of these (excepting perhaps the first) we can at present assign their respective coins from undoubted and numerous specimens, and the succession of the devices on the obverse and reverse will be seen to follow just that modification from the original Mithraic model of the *Ardokro* coin, as would be expected when the source was nearly forgotten, and Hindu ideas became predominant. Moreover, we can, from our coins, add the name of Mahendra-gupta, and perhaps of Assa-gupta to the list, and there is presumptive evidence of a second Samudra as of a second Chandra. Altogether we may reckon upon nine or ten generations, which at an average of eighteen years will fill a space in Indian history of nearly two centuries, of which no written account can be met with; unless the passage in the *Vishnu Purána*†, that the *Guptas*, a *Sudra* family, reigned over a part of *Magadha*, at the time of its compilation, be regarded as alluding to our dynasty. The sites whence their coins have been most frequently obtained, certainly agree with this description; but the date assigned to the *Purána* must in this case be carried back a few centuries, and by the *Mlechhas* of the Indus must be understood the Indo-Scythians rather than the Musalmans. But I had intended to confine myself to an enumeration of the new coins, and to postpone speculation until we are thoroughly acquainted with them. To proceed therefore:

Fig. 11. One of two gold coins of Capt. Cunningham's cabinet (the first procured at *Benares*, the second in *Calcutta*, now with Dr. Swinby). It is a duplicate of my own (from Lieut. Conolly) with the unintelligible legend, engraved as fig. 23 of Plate XXXIX. It was then alluded to as having the letters a little different from mine, and was read *Kragipta Paragu (pta)*. Upon full consideration of each individual letter as compared with those of other coins, I do not think the second letter a *g*; it is rather a *bh*, and the reading altogether कुभावुपरगुज, *Kubhávu paraguja* (adding the *ja* from the obverse of my own coin, where it is quite distinct). Now we have gained experience enough from our reading of this class of coins to expect that the legend, where it does not merely embrace the titles of sovereignty, will express some extravagant epithet. The final *ja* also (implying *born of*,) shews that the said epithet belongs to his father; and this will account for the omission of *ja* on one side of the coin, which would have the effect of making the epithet apply to the son also. The present compound may thus be made up of कु *ku*, a diminutive particle; भाव *bháva*, the mind; उप *upa*, a particle implying similitude; रगु *Ragù* (for RAGHU) the grandfather of RAMA, and ज *ja*, born of* or, united by *Kubháv-uparagu-ja* 'of the humble-minded, resembling-Raghu-born.' The name is unfortunately cut off from the margin. Two letters of it are visible under the Rája's arm on the obverse, and look like अस *Asa*: but on reference to my own coin, I have there no hesitation in reading it समुद्र SAMUDRA. The coin is in this case wrongfully placed at the head of the group in the plate, but as there are two coins to one in favor of the reading *Asa* I still hesitate to remove it, for *Assagupta* is a known name in the *Cashmir* list; and it is, moreover, so like our Azos, that one feels inclined to discover in it a coin of YAVANASO himself, the supposed founder of this *Canouj* dynasty.

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* See Vol. 3, page 344.

† See Wilson's analysis of the *Vishnu Purána*, Jour. As. Soc. I. 440.

Fig. 12. This beautiful coin is an unique in Mr. TREGEAR's possession. It is valuable on every account: as giving an additional link with the Mithraic coins (fig. 9), in the standing cornucopia-female; as adding a new and much desired name to the coin list; and as teaching a good lesson, in the most unequivocal and well formed Nágarí, of the style of legend adopted by these sovereigns; to whom, whether from their extra-Indian, or their low origin, or their limited sway, the panegyrist seems to have avoided applying the usual epithets of royalty, *mahárája dhirája*.

On the *reverse* the reading seems to commence, सर्वराजोच्छत्र *Sarva-rájochhatra*, 'the chatta or overshadower of all the Rájas'—then, on the right of the obverse कामनरुत्तमज घ.... *Káma-naruttama-ja Gha*. (*tót ?*) and under [illegible] arm, written perpendicularly in the Chinese fashion क च KACHA: 'Son-of-an-excellent-man-resembling-KAMA,

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* I have worked out this solution, dictionary in hand; for the Pandits could not aid me in the least: it is therefore quite open to criticism.

Gha(tot) Kacha.' The only portion of this inscription missing is the second syllable of *Ghatot,* which may be replaced with confidence. The Rája is sacrificing on the small Mithraic altar, and is dressed much in the Kanerkos style, though more fashionably.

Fig. 13. Next in succession to **Kacha** comes **Chandra.** Of his coins I have already supplied several examples, (see Nov. 1835, fig. 18, also **Marsden** MLVII.,) but to keep up the comparison of the reverses, I here insert a very perfect sample from Lieut. **Cunningham's** cabinet, procured at *Mirzapur.* Legend on the obverse राजश्रीचन्द्र *Rája Srí Chandra* (the rest only partially visible), and under the arm again च न्द्र *Chandra;* on the *reverse* श्रीविक्रम *Srí Vikrama.* I do not find any instance of the name on this form of coin being written *Chandra-gupta,* although it is distinctly so on the pillar-inscriptions. He is the first to change the trident standard of OOHPKI for the (quasi) Roman eagle. He also prefers the bow to the spear.

Fig. 14. Lieut. **Cunningham's,** from *Gaya,* similar to my own (Capt. **Wade's**) of fig. 16, Plate XXXVIII. Vol. IV. *Fig.* 17 of that plate is another; and seven are now known of the same type, dispersed among us: but few, if any, have the marginal inscription so well developed. As all the coins bearing simply *Vikrama* on them may be set down to **Chandra-gupta,** so all having पराक्रम: *Parakrama* may be assigned to his son **Samudra-gupta** the first. This legend is attached to the same sitting female as before on the reverse. The Rája on the opposite face is just like his predecessors in costume and attitude, with spear and eagle standard.

By means of Messrs. **Cunningham's** and **Tregear's** coins, added to my former specimen, the long legend on the obverse can be nearly all restored; it appears to be समर शत मतग.... वजयजतर.... *Samara ṣatamataga (ja)....* which may be translated ' having the strength of 100 *must* elephants,' and on the opposite margin *vijayajatara....* In my former specimen, however, the final portion read *Aparajita davaja.*

Under the arm the word समुद्र **Samudra** is written in the perpendicular form, the *u* being apparently placed *above* the *m,* because the *d* had taken its proper position below.

ig. 15 is another *Chandra-gupta,* from Col. **Stacy's** box, of h Mr. **Tregear** has a duplicate. Another is engraved in **Mars-** , *fig.* MLVIII. From the alteration of the device, and particularly omission of the fire altar on this coin, we might with plausibility set down to **Chandra-gupta** the second,—but on the same authority we might make two **Samudras**; for these princes seem to have imitated one another so closely, that we find the device of the Rája and his wife

(?) like that of the Rája and eagle standard, repeated on the *Samudra* coin (fig. 12,) and at a later period on a coin of Skanda-gupta (fig. 24, of Plate XXXIX. Vol. IV.) with a change of costume. The Rája's name on this coin is disposed in two perpendicular lines one on each side of the spear च|गु न्द्र|प्त *Chandra-gupta*—the second line, not very clear in Col. Stacy's coin, is quite distinct in Mr. Tregear's, which reached me just too late to be substituted in the engraving. On the reverse, the cornucopia lady is seated on a sleeping lion—as if 'to express ' all will go on prosperously if ye rouse not the wrath of your ruler.'—On the left hand are the words पच्छवय : in the ancient character. The upper prolongation of the *p*, perhaps, indicates an *anuswara*, and thus the reading may be पंच्छवय : *Panch-chhavayas*, ' the five excellencies ;' to wit, of a king.—There is a fault in orthography, however, here, as in the legend of *Ghatot kacha :* the words should be written पञ्च छवय : *Pancha-chhavayas*. Whether the word *chhavaya*, ' light,' may have any allusion to the five luminaries of the Mithraic worship ; the sun, the moon, fire, Jupiter, and Venus, it is impossible to say :—but that a king should possess five virtues, we learn from various Hindu authorities.

Fig. 16. An unique in Captain Cunningham's collection from *Gaya*. The female of the reverse having in the last quitted her Grecian seat, has been here installed in one of a more genuine Hindu character—the lotus flower. There is a peculiarity also in her attitude, both hands being turned up, and the elbows resting on the knees. The legend is unfortunately cut off. On the *obverse*, however, to the left of the usual Rája, we have in very conspicuous letters superposed in the usual style कुम.र : *Kumara*—proving that this is a coin of Kumára-gupta, the successor of Chandra-gupta the second, and thus far in accordance with the Bhitari monument. Lieut. Cunningham has another of the same prince, of quite a different type, (described in Vol. IV. page 637,) but what confirms Kumara's succession to Chandra the second, is, that there are devices common to the two which belong, as far as our researches yet go, to no others,—as if on the accession of the new prince the mint had continued the preceding device, mutato nomine, until another was subsequently selected by the rising monarch. (See figs. 27 and 28, Plate XXXIX. Vol. IV.)

Figs. 17 and 18. For our acquaintance with the owner of the next coin in our series we are entirely indebted to Lieut. Cunningham. He first extracted his name from the *Bhitari-láth* inscription,—and subsequently traced it on these two unique coins in his own, and on one of my, collection, already published; (fig. 24. of Plate XXXIX. Vol. IV.) Fig. 17 is from *Gaya*, and fig. 18 was dug up near a village four kos from *Ghazipur*.

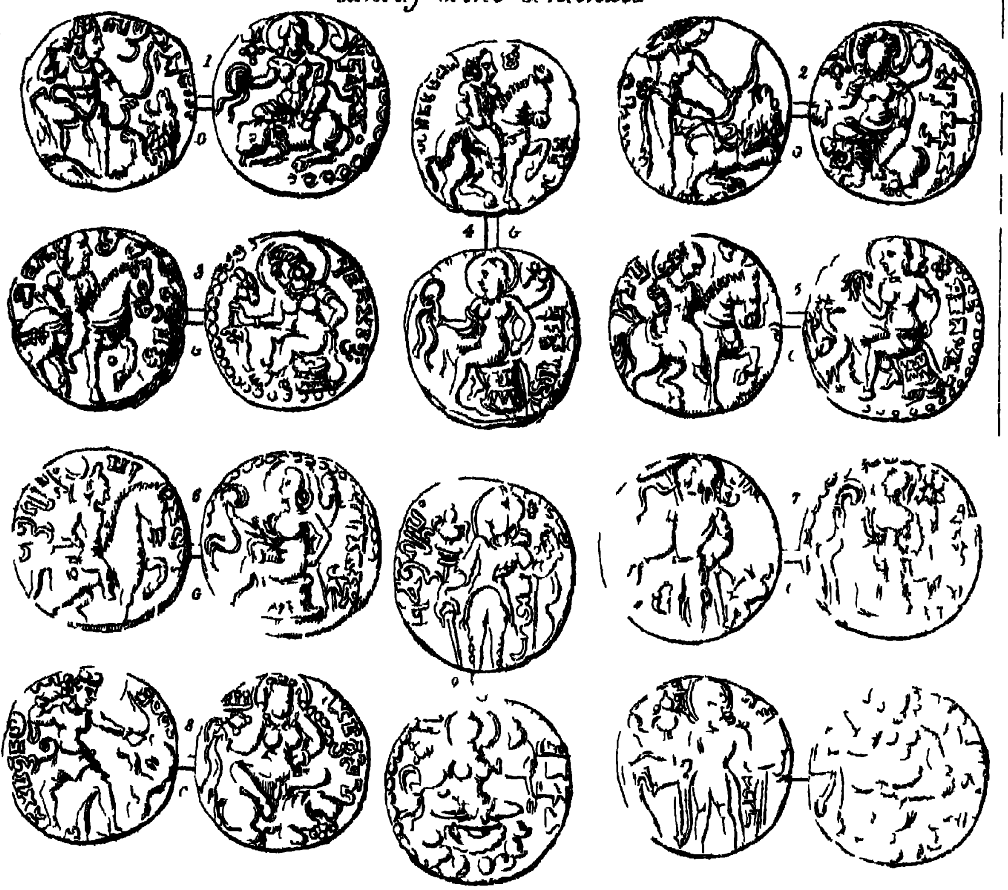
On the *obverse*, the general attitude of the Rája is the same as usual—the waist a little more fashionable, the gaiters absolutely those of the last century! and the hair or wig commencing to be curled in parallel rolls, as will be more fully developed hereafter. The name perpendicularly disposed under the arm of both figures is quite clear, or स्कन्द *Skanda*; while on the reverse of Fig. 18, it is as decidedly (in the old character) 𑀰𑁆𑀭𑀻𑀲𑁆𑀓𑀦𑁆𑀤𑀕𑀼𑀧𑁆𑀢 *Sri Skanda gupta*, the very name of the *Bhitari-láth* successor to Kumára.

On comparing the plates in the Researches and Journal of the coin given to me by Mr. Bacon, many years ago, and then thought rather suspicious, Lieut. Cunningham soon found its legend to be identical with his own;—a fact fully confirmed by re-examination of the coin itself. These three, however, are the only coins yet known of this name. One of them No. 17, exhibits a new name on the reverse, for, unlike 18, it is certainly not *Skanda-gupta*, but क्रममन्दः *Kramamanda*, which may be looked upon as a rhyming epithet—"equal to (or surpassing) *Manda*" (Saturn or Yama). Mr. Tregear has lately got a duplicate of this coin—in which the reading is rather क्रमंवान्दः—one and both may possibly be intended for श्रीमहेन्द्रः *Srí Mahendra*.

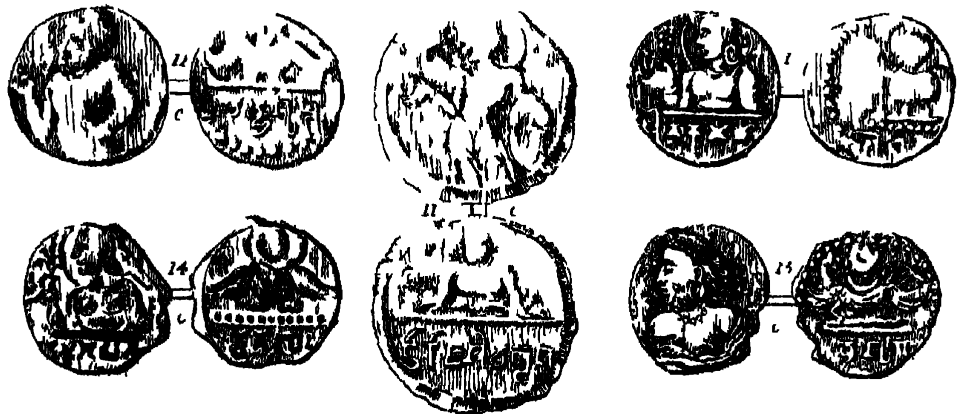
Figs. 19, 20. We now pass to another new acquaintance made out jointly by Lieut. Cunningham and myself on a general inspection of the *Gupta* coins. Fig. 19, is in the Society's collection, and is engraved as No. 14 of the Plates in the 17th Vol. As. Res. unread by professor Wilson. Upon recognizing the final letter न्द्र *ndra*, we soon perceived the preceding letter which I had before mistaken for a *ph*, or *n̆*, to be the old ह, *h*, and thus with the vowel above it, the name was immediately cleared up as श्रीमहेन्द्रः *Srí Mahendra*. Another coin from *Gaya*, belonging to Lieut. Cunningham, turned out to be of the same individual as to the reverse, with some variation in the legend of the obverse. Under the arm of the latter, the letter कु *ku* seems to denote a *Kumara*; but on the margin are evidently the words जयते महेन्द्र *Jayaté Mahendra*. On the Society's coin, fig. 9, the marginal inscription is more complex—परमरजातर, as yet unintelligible; then between the feet श्री *Sri*, and near the hand the letter 𑀕𑀼 *gu* (of *Gupta*) the intervening name being cut off.

Pursuing the examination, we found the coins 29 and 30, of Plate XXXIX. Vol. IV. with the Rája on horseback, and the seated female

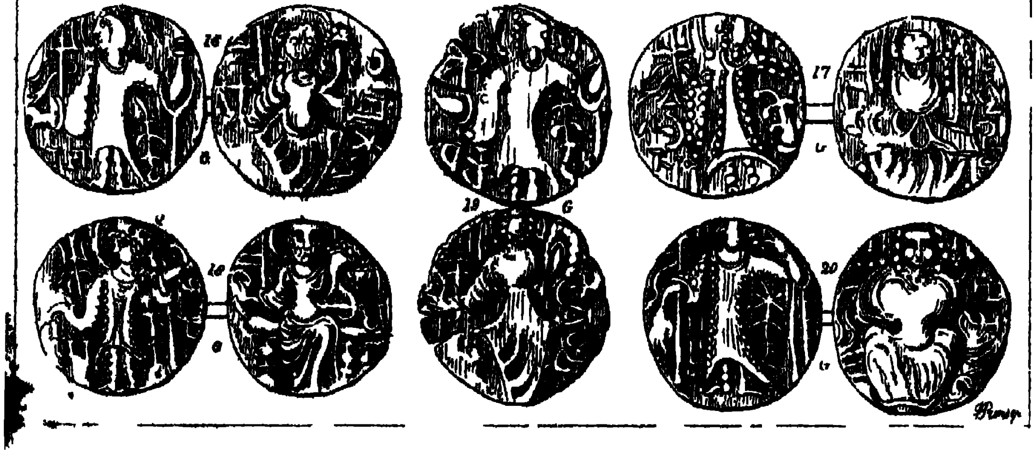
Canouj Coins Continued



Copper Coins of Chandragupta



Second Series of imitations from the Ardokro type



feeding the peacock, to belong also to MAHENDRA-GUPTA. *Ajita Mahendra* on the reverse and *Mahendra-gupta* on the obverse of 30, are quite clear. I was before only misled by the letter *h*, which I read as the nasal *n* of the *láth* alphabet.

I shall have occasion to recur to this name in the next plate, which contains those new forms of the *Canouj* coin that are without the cornucopia female, and have not such direct analogy to their Mithraic prototype as is palpable in the whole of the reverses included in the lower half of the present plate.

Plate XXXVIII.

Figs. 1, 2. These two coins, from Mr. TREGEAR's cabinet, are variations only of the original coin given to me by Lieut. CONOLLY, now became celebrated as having opened the door to the understanding of the whole group. In that coin, however, the archer holds his bow in the wrong hand, whereas in the two present coins, and the one following, the position is rectified and the lion is better developed, particularly in Fig. 2. Besides adding these fine specimens to our series, Mr. TREGEAR has made out the true reading of the legend on the reverse. Instead of *Saccha* or *Pradya* the word is **सिंहविक्रमः** *Sinha Vikrama*, 'the lion hero,' which is consistent with the device, for it may be also understood as 'conqueror of the lion*.' To whom, however, this title is to be applied, would still have remained doubtful, but for the fortunate discovery of another coin by the same indefatigable collector in the prolific neighbourhood of *Jonpur*, while even I was engraving the present plate.

Fig. 8, the coin here alluded to, bears precisely the same device, with variation only of the attitude of the warrior. The legend is different, the part visible being on the *obverse*, **श्री . . तमहेन्द्र जय** *Srí. . ta Mahendra jaya*, and on the *reverse*, **श्रीमहेन्द्रसिंह** *Srí Mahendra Sinha*. Whether the *Mahendra* here designed be distinct from the MAHENDRA GUPTA of the cornucopia reverse, remains to be ascertained.

Figs. 3, 4, 5. From Mr. TREGEAR's collection. These three coins bearing the Rája on horseback on the obverse, and a female seated sideways on a morha or wicker stool on the reverse, are essentially the same as were published in November last, (figs. 29, 30, Plate XXXIX. from Lieut. BURT's and my own coins) which I was then, however, unable to read satisfactorily, from misapprehension of the letter *h*. The legend is in all exactly the same on the reverse, अजित महेन्द्र *Ajita Mahendra:* 'the unconquered Mahendra.' The female holds, in her right hand, variously, a flower, a noose, or food for an attendant peacock, like that of the *Kumára* coins.

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* It is remarkable that in most cases the word *Sinha* (or more properly *Simha*) is written with an unknown letter superposed to the ह. This must be the nasal *m*, for which the *anuswara* is now substituted. In fig. 2 the letter is palpably an 𑀫, *m*, to which is subjoined the *h* 𑀳; but in figs. 1 and 8, and in my coin, the letter has the form of ⊏.

On the *obverse* the legend is more variable.

In No. 3, we have the letters अजित पुव.... तविक....
In No. 4, not legible . तवि
In No. 5, अय .. not legible.

Fig. 6. (Tregear). This coin resembles in all respects the foregoing, excepting as to the legend, which is on the *obverse*, beginning at the top परमेश.... न्द्रगुप्त: *Paramès (vara ? Cha* or *mahè) ndra-gupta*. On the reverse (the second letter being very clear on a duplicate coin in Capt. Cunningham's cabinet) अजित विक्रम: *Ajita Vikrama*. This name so closely resembles the common pronunciation of *Vicramajit*, (correctly written Vikramáditya,) that although it may not belong to that celebrated sovereign, it is very possible that matters appertaining to the history of the one may have been transferred to the other, and hence some of the confusion, so perplexing to the historian, have originated.

Fig. 7. An unique lately procured by Mr. Tregear. The Rája on the *obverse* is of a peaceful character, with hand extended but no altar. A diminutive attendant holds a chatta over his head. The letters on the margin are not legible. On the reverse is the standing cornucopia female holding a well depicted lotus flower, with a lateral inscription which may be read विक्रमादित्य: *Vikramáditya ;* but although the length of the subjoined *y* exceeds that usually found in the *d*, and the *di* is not much like the *ch*, it is probable that the word is after all only विक्रमचन्द्र: *Vikrama Chandra:* and we must not allow our sanguine imagination to rejoice in having at length hit upon a veritable coin of the author of the *Samvat* era ; against which there is also a cogent chronological obstacle, in the date hitherto assigned to our dynasty of *Guptas**.

Fig. 9 (Tr.) is introduced as a new variety of the *Chandra-gupta* coinage : only differing from the numerous class before described in the legends, which are very clearly on the *obverse*, श्रीचन्द्रगुप्त:.... *Srí Chandra-gupta*, (the titles not legible,) and on the *reverse* श्रीविक्रम: *Srí Vikrama*.

Fig. 10, of Mr. Tregear's collection, was engraved as a doubtful name, but I think it may be set down as belonging to Skanda-gupta.

Figs. 11 to 15. This curious class of copper coins has not yet been brought to notice. They are indeed much more scarce than the gold coins of the same age, and hitherto only those of one individual

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*** Mr. Tregear has since written that on re-examination the word is palpably *Vikramaditya*.**

of the family have been met with. It was not until Mr. Tregear's highly curious specimen, fig. 11, had furnished us with the style of Chandra's copper coins that we were led to re-examine our several collections, in which were found, and became legible, a few rare specimens of the same character.

Fig. 11 has the portrait of the Rája on one side, with a smaller, perhaps female, figure on his left hand. On the reverse a front face of him is presented, leaning, as it were, on a window sill: below which in very well defined characters, ... हाराज श्रीचन्द्रगुप्तः *(Srí ma) hárája Srí Chandra-gupta.*

Fig. 12 is a demi-coin of similar stamp, one of two belonging also to Mr. Tregear: but on the reverse of this, as in all that follow, the device, is a bird, the same that figures on the military standard of the gold coins, and which Mr. Wilson says "looks more like a goose than a Roman eagle." The inscription is very well preserved, श्रीचन्द्रगुप्त *Srí Chandra-gupta.*

Fig. 13 is from Col. Stacy's cabinet: the obverse, well executed, represents the bust of the Rája holding a flower; beneath, श्रीविक्रम.. *Srí Vikrama;* the next letter may be च or म; but on the reverse are distinguishable the initial letters श्रीच.. *Sri Cha*.... proving that the coin belongs to Chandra-gupta.

Fig. 14 is from Col. Swiney's cabinet, in all respects a duplicate of the last, but the reverse legend is even more distinctly . . . . चन्द्रगुप्त the lower part of the *ndra* only is effaced.

Fig. 15 had escaped notice in my own cabinet:—the head is more highly finished than in the other specimens, but the legend could not have been understood without their aid:—it is . . . . न्द्रगुप्त. . . . *ndra-gupta.*

Before quitting this very interesting group of coins, I must not omit to notice the only silver specimen which has yet come under my observation: it belongs to Dr. Swiney, and is . . . . a forgery!—not a modern one, but an actual false coin of the period when it was struck. It is of copper thickly plated, but the silver plate is worn through in several places, exposing the interior nucleus. I have depicted it in Plate XXXIX. Fig. 21.

Obverse, the Rája in the original sacrificing attitude; under his left arm the letters अजय *Ajaya* or राजय *Rája y*...

Reverse. Goddess (Durga?) seated in the native fashion with cornucopia (or flower) and glory—a small elephant with trunk uplifted for protection, on her right shoulder. The marginal inscription श्रीप्रकनौ. . .... *Sri Prakanau* . . . . the last letter may be double n,—but in neither manner does it present an intelligible word.

Second Series of imitations.

We now pass to another series of coins evidently descended from the same '*Ardokro*' type coin to which the early Canouj group has been so satisfactorily traced. In the latter case we have seen that the Hindu artists soon quitted their original, and exercised a fertile invention in varying the device during several generations of princes: but in the coins we have now to notice, no claims to ingenuity can be advanced; unless it be for gradually barbarizing and disguising the original type, so that it would have been absolutely impossible to recognize the character of the extraordinary symbols on the later pieces, had we not a numerous train of specimens to produce, in evidence of the gradual deterioration. I had already more than once engraved specimens of this curious series, thinking them to be merely the link coins between the *Rao nano rao* and the early Canouj series. Among the Manikyála coins was the only silver coin of the set on which I had particularly remarked legible Sanscrit characters; which were of a form and age differing essentially from the Canouj coin alphabet (so called). But now through Capt. Cunningham's careful scrutiny of all our available collections, I am enabled to produce a host of variable legends, which may be the means of developing by and bye a second royal dynasty of some other Indian locality, as successfully as has been the case with the Gupta family.

Henceforward my readers should understand, and they will, doubtless, soon perceive the fact, that my coin essays are joint productions, and that I have an auxiliary at my elbow, far better acquainted with the contents of, I may say, all the collections of coins in India, than I have leisure to become. With his zealous aid in hunting out the unpublished varieties of every class, I hope to make these notices complete as far as discovery has yet proceeded, and to do fuller justice to the numerous contributions I continue to receive from my numismatic co-adjutors in the interior.

That the present class is totally distinct from the last, may be argued on many grounds:—those are discovered in greatest quantity at *Canouj, Jonpur, Gaya,* and even occasionally in Bengal,—these are chiefly met with in Upper India, and in the *Panjáb*. Capt. Cautley has sent me one dug up in the foundations of his residence near *Seharanpur;* Mr. Dean dug up some at *Samehana* near *Delhi*:—but the most important fact in their history is the extraction of one of the lowest members of the group from the Manikyála tope by General Ventura. Mr. Masson's large collection in *Afghánistán* does not contain one of this type, nor any of the first or Canouj series. They are, therefore, purely of Indian growth. To Upper India, the *Panjáb* or *Cashmir*, then we must turn our view in seeking the focus whence they were issued, and fortunately we have authentic lists of the sovereigns of some of these places to consult.

But first to enumerate the coins :—

Fig. 18. A gold coin (Stacy) weight 120 grs.* deserves to be mentioned first, because the workmanship is nearest in perfection—in *imperfection* we might rather say,—to the '*nano rao*,' or '*Ardokro*' original. The legs of the couch, cornucopia, and drapery, are well defined. The rája on the obverse has his trident standard, and his right hand outstretched as over the fire altar, but the altar is omitted. Under the right hand of the rája, both in this coin and in figs. 16 and 20, occur the letters पस *pasa* either side by side as in 16, or superposed as in 20. Under the left arm, which is clevated to hold a spear, is another perpendicular combination of two or three consonants, apparently स क, and द् with the vowel ए *e*. The same monogram (or rather polygram) continues through the whole series. I formerly took it for a sword handle, which it exactly resembles when the lowermost letter is hid.

Fig. 20. (Stacy) the next best in execution, has the letters श्रीक्र *Sri Kri*.... visible on the left of the female.

Fig. 19. (Tregear :—duplicate, Cunningham) continues the word ; क्रगोधाय *Krigodháya ?* or *Kribhodháya*.

Figs. 16 and 17 of my cabinet have the letters श्रीविश्व.... *Srí Visva*.... or *Vikha* on the former, and पसल.... *Pasala*... (or perhaps *Visala ?)* on the latter.

Numerous other specimens in gold might be enumerated,—but they generally contain even less satisfactory fragments of names than the above. All that can be positively asserted is that the letters are Sanscrit, and, on these at least, of the same alphabet as that we have designated No. 2 of the *Allahabad* láth.

The silver coins of this second series are much more scarce than the gold and copper ones.—The three I possess, represented in figs. 1, 2, and 3, appear also to be of a very debased standard, and to belong to a much later period. None of them retain more than the rudest semblance of the rája figure—and still less of the goddess ;—the latter has even been taken for a dagger, the former for a scorpion ! The letters also are of a more modern formation, not differing much from those of the tenth century, found at *Sárnáth* and other places. Captain Cunningham first pointed out to me the words श्रीप्रताप *Srí Pratápa*:... on figs. 1 and 2.

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* The weight of all these coins is nearly the same, being in fact the didrachma of the Greeks.

Plate XXXIX.

On *fig.* 3, on a former occasion I had already read श्रीयत . . *Srí Yag.*. but as there are traces of a cross-line to the loop of the third letter, I am inclined to adopt rather the reading यश . *Yasa* . . *Yasa* glory, forming in composition many Indian names, as *Yasa Vigraha, Yas o Varma, Yas o Pála, Yaswant,* &c.

The two earliest specimens of the copper series, figs. 4 and 5, are from Col. Stacy's and Capt. Cunningham's cabinets respectively. The first has several letters of the old character:—under the left arm perpendicularly सयध . *Sayadha*, and on the exterior मक *maka*.

Fig. 5 is, in reality, a forgery of a gold coin: the remains of the ancient gilding are still perceptible in the angles. The monogram is the same as in fig. 18, of the last Plate.

Figs. 8 and 9 are selected from Col. Stacy's box as examples of the name of श्रीप्रताप, *Srí Pratápa*, in the two forms of alphabet.—Probably they belong to different individuals of the same family name.

Fig. 8, is a valuable unique in Col. Swiney's drawers, with a multitude of letters that have usurped the natural position of arms, cornucopia, throne, and all such appurtenances!—On the obverse are the letters जय *jaya:* on the opposite face, श्रीविनद *Srí Vinada* or विरव *Virava* . and to the right म (?) न्देद *mandĕd* . . .

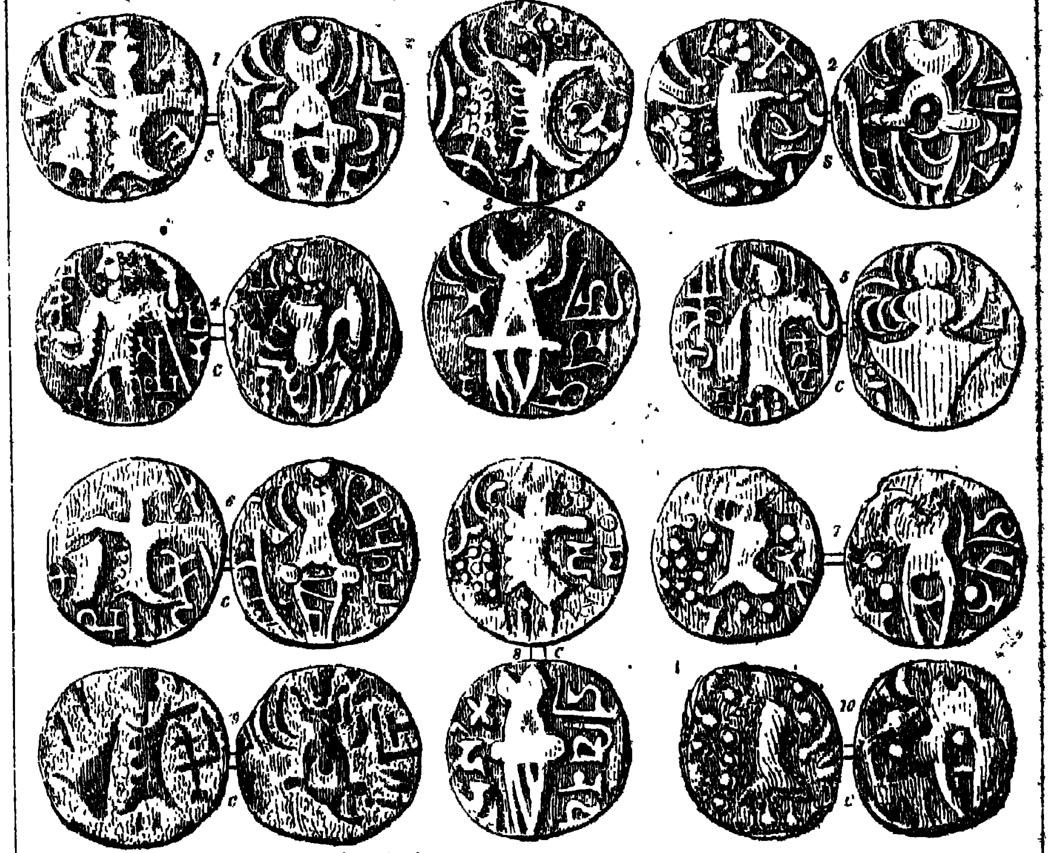
Fig. 9. The word *Srí* is still perceptible.

Fig. 10 is but introduced (from my collection) to shew the complete barbarism that finally prevailed. Such rude pieces are to be had in plenty, for one that contains a trace of writing. *Pratápa* is the commonest name on those that are by any means legible.

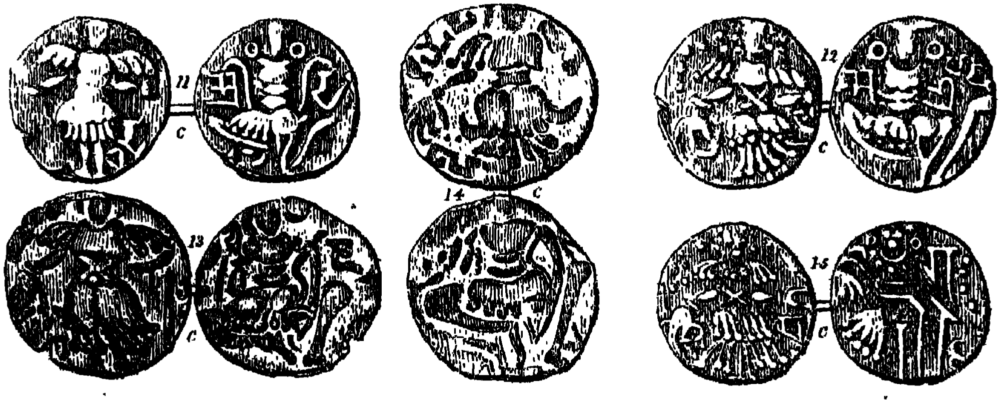
Third Series of imitations.

The next five coins of my Plate represent a very numerous class of Hindu coins, grotesque but very bold in execution, and attempting refinement in the position of the right hand of the rája, and in the sitting posture of the reverse. Having pointed out the prototype of the European coat, pantaloons, gaiter and wig on one series, I must not pass unheeded the *epaulette* so faithfully and curiously portrayed on the obverses of this series! I am induced to consider them a third instance of imitation of the *Ardokro* type from their general aspect and attitudes:—moreover the cornucopia is traceable in the earlier pieces as figs. 13 (Sta.) and 14 (J. P.) As they deteriorate, the limbs are lopped off as usual to make way for Nágarí characters! This is well exemplified in fig. 11 (Cunn.) and 12 (Sta.) Fig. 17 (Swi.) may be regarded as the ultimate degradation of the type.

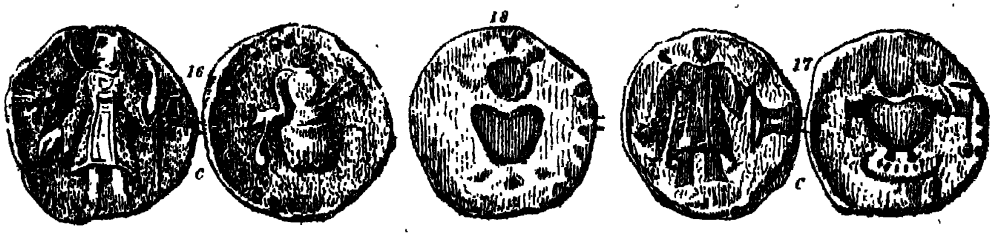
Second Series Continued.



Third Series, of imitations

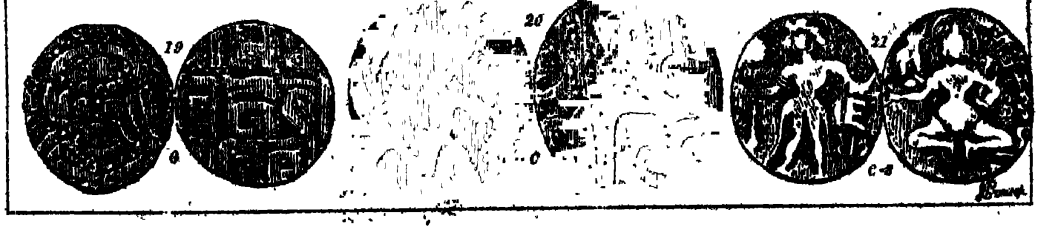


Fourth Series, of imitations



Deva dynasty of Canouj

See 1st Series.



Of legends we have in fig. 15, on the margin ..यो.. *yo*.. On fig. 16, reverse, the letter ज *ja*. On fig. 11, on either arm of the sitting figure श्रीदि *Srí di ?* and on fig. 12 several uncertain letters scattered about स प त य. In the last of the set, the letter ग stands alone.

It would be in vain to attempt any explanation of such vague symbols. Of this series of coins M. COURT's drawings contained many good samples. They are plentiful in the *Panjab*, less so in Upper India, and comparatively rare in *Afghánistán*. Mr. MASSON has only given one, and that very degraded.

Fourth Series.

These shadows of the *Kanerkan* king are alike DUNCAN's issue,— " a fourth ?—start eyes! what will the line stretch out to the crack of doom ? another yet ?"—Such is, however, the singular fact; whether they " reigned in this kingdom" consecutively, or in subdivided portions of it, there can be no doubt of the common source whence these numerous progeny have borrowed their family features. Amid the hundreds of each kind, now open to our examination and selection, the progress of deviation can readily be followed: and it is not a little curious to see the different results of corruption arrived at by different engravers or moniers, in the course, perhaps, of a few generations. In one case we come to a kind of dagger—in another to a few dots and strokes—and in the present instance to a kind of heart, formed of the knees and petticoat of the seated female! The best of the three coins depicted in the engraving are from MOHAN LA'L's collection; the worst from Capt. CAUTLEY's disinterred *Behat* relics, where a large proportion of these *heart* coins was found in association with the supposed Buddhist coins, described in my essay of last November. I can find but one approach to a letter on any of them, viz. the वि to the left of the well formed Rája in fig. 16. It is hardly sufficient to confirm their Indian origin: and it must be noted that this species is found in abundance farther to the north-west than any of the others.

Thus Mr. MASSON says of them: " this series is very extensively found in western *Afghánistán*. The *obverse* has a rude figure of the prince, clad in mail with the accompaniment of the fire altar," (not visible in ours, but clearly so in M.'s drawings) " and on the reverse a figure seated on a throne with her foot on a footstool. On no one coin of the class have I been able to detect the legend, although they appear in some instances to have had characters intended for such. Figs. 61 to 63," (those that shew the chair, the cornucopia and noose) " are generally found at *Beghram*, figs. 64 to 66," (those having only the outline of a heart,) " are the types prevalent on the banks of the Indus and in the *Panjáb,*"—and, as we have stated above, near *Seharanpur* in India proper. This series has, undoubtedly, a better claim to be considered the genuine descendant of the *Ardokro* coin *in situ* than any of the three preceding series.

To sum up my review of these coins, I cannot help remarking how great an analogy exists between the circumstance of these several adoptions by subordinate imitators, of a predominant form of coinage that had perhaps prevailed for centuries under a paramount rule; and the nearly parallel case of the Sha'h A'lam coinage of the last century, the very words and form of which were copied by the numerous rájas and nawábs, who assumed the privilege of coinage upon the dismemberment of the *Delhi* monarchy. In many places, a few years only, have sufficed so to disfigure the Persian letters, as to render them quite illegible and barbarous.

Pála or Déva dynasty of Canouj.

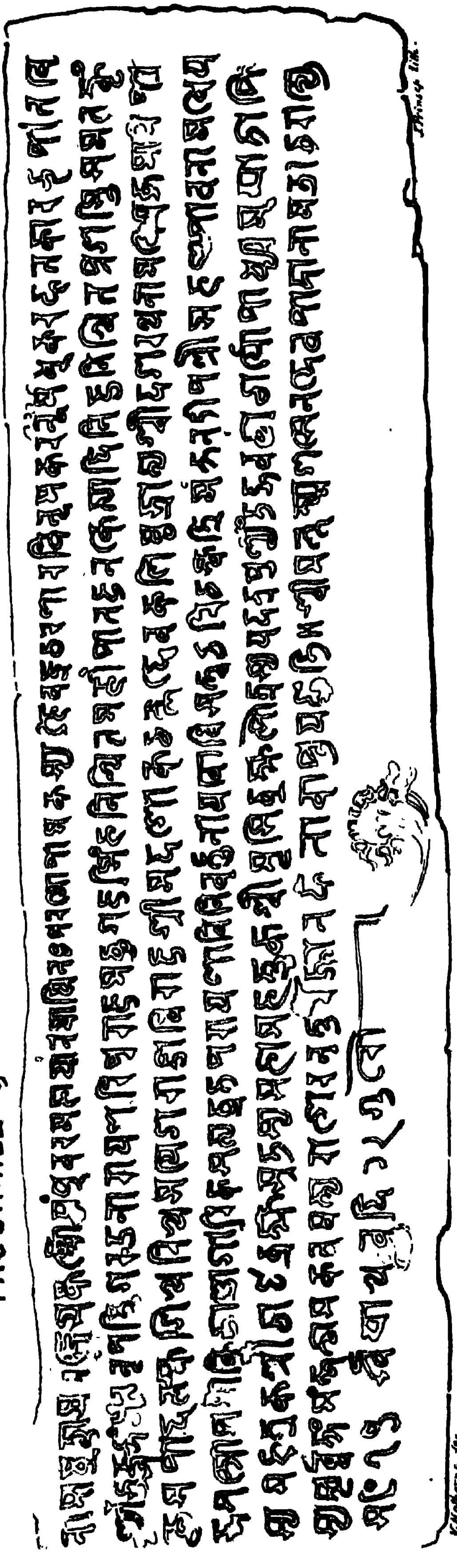
By way of filling the plate, I have engraved at foot, two new specimens of this dynasty, brought to light since the publication of Plate L. Vol. IV.

Fig. 19 is taken from a cast of a gold coin, in Col. T. P. Smith's possession. Some of the letters are new in form, but they may possibly be read श्रीमद्विग्रह पालदेव *Srí mad Vigrahapála deva.*

Fig. 20 is an unique copper coin of Capt. Cunningham's. On the obverse, the four-handed god is crushing a demon—instead of being seated in the usual serene attitude. The legend on the other side may be read, श्रीमत्पृथ्वीदेव *Srí mat Prithí deva*, a name occurring in the *Delhí* list as having reigned at *Lahore* A. D. 1176—1192: but not to be found among the many names which inscriptions have given us of the *Bhupála* family of Canouj and Benares.

Mr. Masson has figured a third new name of the same group, which I have inadvertently neglected to introduce in this plate as I had intended. The letters that are visible are श्रीम.... मीरमरस ..देव *Srí ma.... míramas.. deva.* The first and last letters are half cut off, and the vowel may be an *á*, so that the reading may possibly be *Srí m(at Ku)mára mah(á Rája) deva.* Mr. Masson says that "at *Kábul* coins of this peculiar type are met with occasionally in the bazar, generally of gold. A large parcel was dug up out of the soil, three or four years ago, near *Korinder* a village of *Koh-daman.*" He places them as the last of the Indo-Scythic series, not having, at the time of writing, seen what had been made of them here. If indeed the sitting female be a far descendant from the Mithraic goddess, the long interval of six or eight centuries will fully account for the magnitude of her transformation.

FACSIMILE of an INSCRIPTION at Buddha-Gaya. taken in 1835.

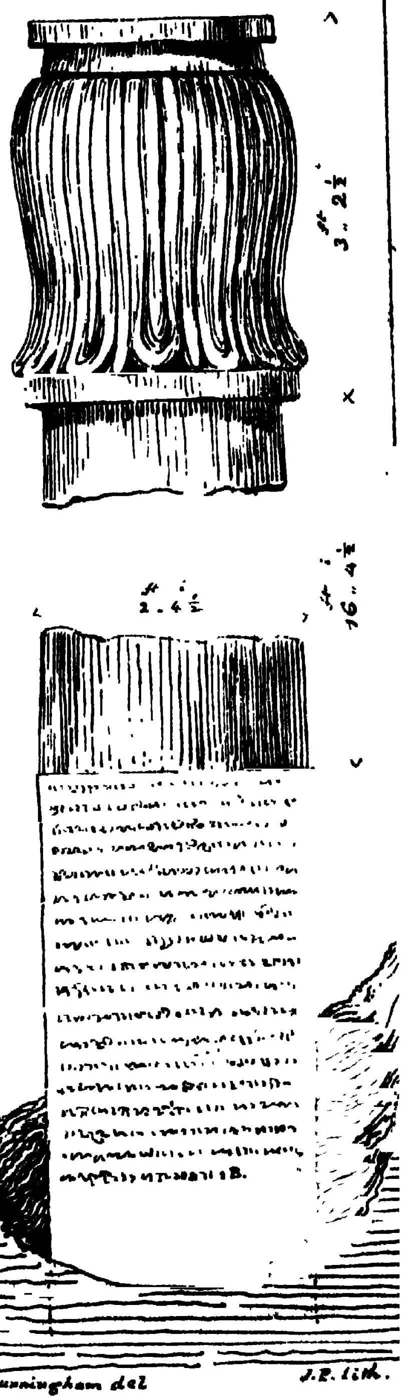


J. Prinsep lith.

V. Halhorne fec

Elevation of the LATH at Bihtari, Ghazipur.

(for inscription, see Pl. XXXII.)



A Cunningham del

J.P. lith.

It is a great pity that the horde discovered at *Korinder* was not secured at once. It might have contributed very materially to our classification of this second *Canouj* dynasty. A great many specimens of the same sort must also be scattered about in the cabinets of retired Indians at home; and we may hope now that Professor WILSON has commenced upon the task of examining the coins in the Royal Asiatic Society and India House collections, specimens will flow in to him from all quarters to be decyphered and described.

V.—*Facsimiles of various Ancient Inscriptions, lithographed by* JAMES PRINSEP, *Secretary As. Soc. &c.*

[Continued from page 561.]

Inscriptions from Buddha-Gaya, Plate XXX.

The neighbourhood of *Gaya* has long been known to be prolific of inscriptions:—yet, notwithstanding the various notices of them which have appeared in the Researches, of the Bengal, and of the London Societies, the theme is, as yet, by no means exhausted. Mr. HARINGTON furnished our Society at a very early period after its institution with copies of two inscriptions from the principal cave, lying in the hill of *Nagarjuna,* (the name, it will be remembered, of a celebrated Buddhist patriarch,) one of which was decyphered by Dr. WILKINS, and proved to be a record of the excavation of the cave by ANANTA VARMA, the grandson of YAGNA VARMA. The date is not given, but the character (No. 2 of the *Allahabad lāth)* shews it to belong to an early century of the Christian era. Mr. HARINGTON mentions several other caves and inscriptions which have not yet been examined.

Dr. WILKINS also translated one inscription copied from a stone by Mr. WILMOT in 1785, (As. Res. vol. i. 284,) dated Samvat 1005, purporting that AMARA DEVA, the author of the *Amera kosha,* built the temple of Buddha at *Buddha-gaya.*

Dr. HAMILTON (Roy. As. Soc. Trans. vol. ii. 44,) in his account of the ruins of Buddha Gaya, alludes cursorily to inscriptions on two images of *Gautama,* recording their erection, one by JAYA SEN and KUMA'RA SEN, sons of PUNYABHADRA, son of SAMANTA, all untitled persons: the other by Rája VIJYABHADRA, of whom nothing more is known.

The Burmese inscription found by the Embassy in 1831, was of a more interesting description. It is described in the Journal (vol. iii. page 214), and more fully by Colonel BURNEY in the last volume of the Researches. It was upon the occasion of my requesting Mr. HATHORNE, then magistrate of *Gaya,* to take a duplicate of the Burmese facsimile, that this gentleman went beyond his commission, and kindly furnished me with facsimiles of several other inscriptions in the neighbourhood of the ancient temple, all of which, he says, are quite illegible to the learned pandits of *Gaya.*

"No. 2, (No. 1 being the Burmese inscription) he writes, is on a stone lying near the *Mahá Buddha* temple." A copy of this, noted by Hamilton as 'an inscription of considerable length,' appears to be deposited in the E. I. C.'s Museum, labelled No. 113, but no further account of it is furnished. It is this inscription which I have lithographed in Plate XXX; but before proceeding to its discussion, it will be better to notice the other items of Mr. Hathorne's dispatch.

"No. 3 is an inscription on a stone, inserted in the wall of a Brahman's house erected on the site of the old fort, said to have belonged to Rája Ami'r Sinh, who went over to the Burman empire, became converted to the Bauddha faith, and died in that country." This is evidently the inscription translated by Wilkins; the Rája Ami'r being the Amara above mentioned, : and the story of his conversion has merely been altered a little in repetition, and mixed up with the more recent collisions between the Burmese defendants of the shrine and the Rajput expeditions against these infidels in the 12th and 13th centuries. Perhaps the similarity of the name to the celebrated Hami'ra Sinh of *Chitor* may have helped to confound the tradition. It is unnecessary to republish this inscription.

"No. 4 is inscribed in a circular form over an image of *Deví* in the *Mahant's* garden." This, again, is alluded to by Dr. Hamilton as No. 99 of the India House museum, "on a *male* figure now called *Saraswatí* (a goddess), is the usual pious sentence of the Buddhist." It is useless to lithograph this inscription, which does not differ even in the form of the letters from the "*Yè dharma hetu,* &c." of the *Sárnáth* and *Tirhut* images.

"No. 5 is a word engraved on a pillar which now forms one of the stanchions to an upper story in the convent. The character you will observe assimilates to the ancient inscriptions." This I have found room to insert in Plate XXXIII., but it is impossible to make any thing of it: perhaps it formed part of a longer inscription in the oldest láth character.

No. 2, then, is the only one of the series which requires further observation. From my acquired experience in such matters, there was little difficulty in transcribing the whole from the facsimile (lithographed on a reduced scale in Plate XXX.) into the modern Nágarí, nor in preparing a translation with the assistance of the Society's pandit, and of Ratna Paula, whose acquaintance with the Buddhist tenets enabled him to correct the former in several doubtful readings.

The character may be properly designated as the *Gaur* alphabet, the parent of the modern *Bengálí* form. The specimen is chronologically valuable to the investigation of the gradual alterations it has undergone, because it contains a date, *Samvat* 73 or 74, of an era that has been the subject of some misapprehension. Mr. Colebrooke rectified Dr. Wilkins' mistake in supposing this *sambat* could refer to the era of Vikramáditya, and assumed a position for it 1000 years more modern, in connection with the *Gopala* or *Bhupála* dynasty of *Gaur*. The document before us corroborates this view; but by the expression, "after the expiration of the reign of Laxmana Se'na," it would seem that the term *samvat* applied generally to whatever epoch might be mentioned in the preceding sentence. Laxmana Se'na, the son of Belal Sen, who built the city of *Gaur*, reigned in A. D. 1116—1123: so that the date of the inscription on this supposition would be A. D. 1197, only three years prior to the destruction of the monarchy by the Musalmans. The figures, however, are unfortunately doubtful, just where their identification is of the greatest consequence:—the first might be read as the Nágarí 1, were not the numerals of the month so clearly of the Bengálí form. If counted from the foundation of *Gaur* in 1066, the date would fall in 1140. Were there any possibility of assuming a starting point on satisfactory data, the day of the week, Thursday, would afford a sure test of its being correctly fixed, by the calculation of the luni-solar period elapsed: but according to the formula in my calendric tables, neither of the epochs above selected will bring about such a result.

The following is the transcript of the facsimile in modern Nágarí. One letter after *Namobuddháya* is illegible, and the next word is consequently doubtful: *anusvara* is substituted for ङ.

नमो बुद्धाय संकस्पोयं प्रवरमहायानीरखामिनः परमोपासकस्य देवग्रचरणारविन्द
मकरन्दमधुकरस्यकारभूपालवंशोत्पन्न छव्यन्दपतिमहकनारायणरिपुराजमत्तगज
सिंहनिखिलमहीपालजनकेत्यादिनिजनिखिलप्रशस्तिसमलंकृतं सपादलक्षशिखरि
लक्षमेव राजाधिराजश्रीमदशोकचन्द्रदेवकलिङ्गधालश्रीदशरथनामधेयकुमारपादप
द्मोपजीवि भाण्डागारिकसत्यव्रतपरायणा विनिवर्णनीयबोधिसत्वचरितस्तम्भि सकुल
द्वीपश्रीसहदेवपाल्नामधेयस्य महात्मकश्रीचाटग्रसुतस्यमहामहात्मकश्रीमदपित्रपौत्र
स्ययदत्रपुण्यं तद्भवदाचार्य्योपाध्यायमातापितृपूर्व्वाङ्गमं कृत्वा सकलपुण्यराशिरनन्तवि
ज्ञानफलावाप्तयइति श्रीमल्लक्ष्मणसेन ेवपादानामतीतराज्ये •
सं ७४ वैशाख वदि १२ गुरौ

Translation.

" Salutation to *Buddha.*—May this votive aspiration of the devoted votary to *Mahávira Swámi**—(Of him who is) in holiness like the blue-bee steeped in the honied lotus of the feet of a divine personage, and in might like the lion triumphant over the infuriate elephant, who reigns over the royal and puissant progeny of Hulkara Bhupa'la, named Krishna Nripati and Garudana'rayana, his inveterate antagonists—who is himself the gracious father (protector) of tributary kings—who, adorned with such might and virtues, sways the imperial sceptre over 125000 kingdoms well people with mountaineer warriors—the king of kings—the auspicious and high in dignity Asoka Chandra Deva,—(of the aforesaid Rája's) younger brother, Dasaratha Kuma'ra, supported and maintained through the lotus of his gracious feet, his dependent treasurer, a conscientious Bodhisatwa—the light of his tribe and family, by name Sahasrapa'da, son of the dignified Sri' Cha'ta Brahma, and grandson of Mrishi Brahma—may (this his holy act), united with the virtues of his teachers and *guru,* his mother and father, enable to attain the fruit of immortal wisdom, salvation from passions and delusions of sublunary existence, and absorption of his soul in the Supreme Being."

" Written after the conclusion of the reign of *Srí mat* Laxmana Sena Deva, in the year 74, on Thursday, the 12th day of the dark half of the month of *Vaisakha.*"

The inversion of the sentence, and the multitude of epithets applied to each party, makes it difficult for an English reader to follow the sense through such a labyrinth :—in a few words, it prays that some good act (probably the building or endowment of a temple) may redound to the eternal welfare of one Sahasrapa'da, the treasurer of Dasaratha Kuma'ra, the younger brother of Maharája Asoka Chandra Deva, the reigning prince of a dynasty that had supplanted by conquest some descendants of the Bhupala family, (of *Gaur* doubtless,) by name Krishna, and Garudana'ra'yan. All these names and persons I believe are new to history: at least I find no Asoka among the successors of Bela'l Se'n. From his assumption of such a name it may be presumed that he was of the Buddhist faith, as the invocation shews to have been the case also with his officers of state.

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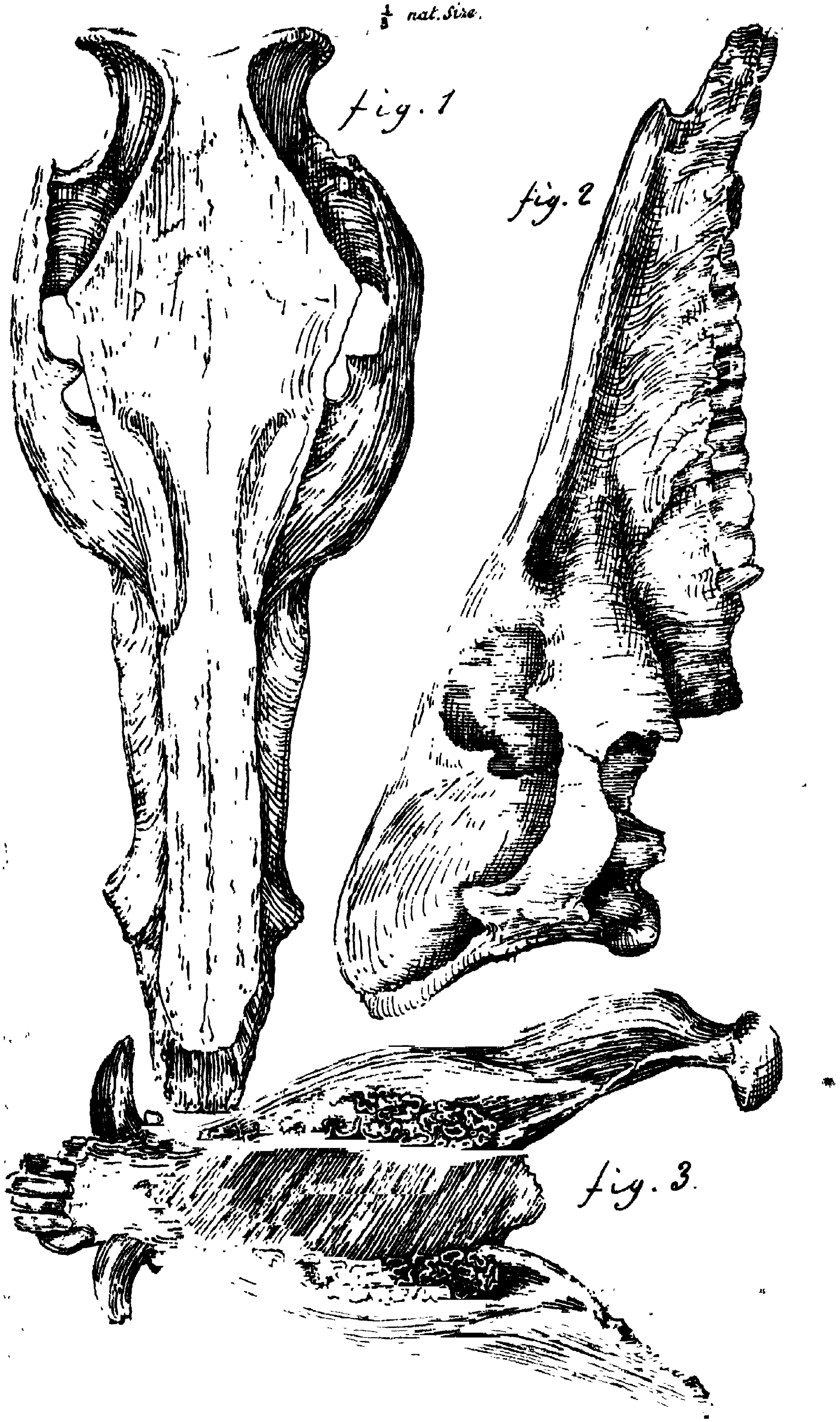
* **Buddha, the transcendently victorious hero. The construction of the sentence, which it is endeavoured to follow closely, will be hardly intelligible without explaining that this first epithet belongs to Sahasrapa'da, whose name occurs lower down.**

SubHimalayan Fossil Remains. Sus.

$\frac{1}{8}$ nat. Size.



Printed at the Oriental Lith.c Press. Calcutta.

Bhitari Láth.

On the same plate I have lithographed from a drawing by Captain Cunningham an elevation of the *Bhitari láth* in the *Ghazipur* district, of which so much have been said. It was Mr. Tregear who first brought it to notice in 1834; he sent me a rough pencil sketch, and promised further examination. This was accomplished in company with Captain Cunningham; when on clearing away the earth from the lower part of the shaft a long inscription was discovered. It was immediately seen to be in the same character as No. 2 of the *Allahabad láth*—and while taking a copy of it in pencil, the names of Rájas Sri' Gupta, Ghatot kacha, Chandra-gupta, Samudra-gupta, were found following in succession, exactly as on the *Allahabad* inscription—other names, Chandra-gupta, Kuma'ra-gupta, and Skanda-gupta, succeeded; proving that this pillar had been erected several reigns subsequently to the other, and confirming in an extraordinary manner the concatenation of the *Canouj* coins of this very Gupta family, as has been noticed in a preceding paper.—More need not be said at present, as the inscription itself will appear next month with Dr. Mill's interpretation and valuable comments.

There are two other pillars near *Ghazipur*, at *Zamineah*, south of the *Ganges*, from which great expectations were entertained, of our making a further acquisition—but we have just been disappointed. Col. Povoleri writes me, that Mr. Murray has closely examined the principal pillar without finding any trace of writing on it; he is about to dig around it, however, for the square portion of the shaft may possibly be buried below the soil. This is our only chance.

VI.—*Sub-Himálayan Fossil Remains of the Dádupúr Collection.* *By Lieuts.* W. E. Baker *and* H. M. Durand, *Engineers.*

Genus Sus*.

Cuvier has confined his remarks upon the fossil remains of the genus *Sus* to a brief notice of their existence, in consequence, it appears, of the fact that up to the time at which the *Recherches sur les Ossemens fossiles* were published, the instances of the occurrence of fossils of this genus were rare; and of the small number discovered the greater portion had been found in peat. The tables given in the latest geological manuals show, that in the interval which has elapsed since the publication of Cuvier's work a few sites have afforded specimens, but still the remains in comparison with those of other genera are far from being abundant. By reference to the table of Sub-Himálayan fossil genera in the 53rd No. of the Journal of the Asiatic Society it will be observed, that, although here found in greater quantity than in European localities, the relics of the genus are, in comparison with those of most of the other Pachydermata, scarce. Notwithstanding their small number, the specimens in our possession, happening in general to be tolerably perfect, form a series which, though not continuous, is sufficiently perfect to illustrate the dentition of one of the species.

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* The Plates B and C mentioned in the ensuing descriptions, have been incorporated in Plate XLIV., and had been reserved for the Researches, on account of their dimensions; but we see they are necessary to the article, and have inserted them with Col. Colvin's lithograph.—Ed.

To the consideration of this species we without further introduction proceed; premising only, that with the exception of the cranium of which fig. 6, Pl. B, is a representation, the whole of the specimens referred to are from the *Maginand* deposit, a general description of which prefaces our notes on the fossil unicorn-rhinoceros.

Cranium. The fossil, of which figs. 1 and 2, Pl. XXXIV. are representations, is the cranium of the sow of the species to be described. The specimen has been less crushed than is usual, but has not altogether escaped. The nasal bones are not quite centrical, and in their natural position, being thrust over towards the left maxillary by a crush which acted on the right side of the head. The mastoid apophyses and the descending tubercles in their front are broken off; the extremities of the pterygoid apophysis are also mutilated:—the zygomatic apophysis of the temporal, if perfect, cannot be cleared completely from the matrix which adheres to it, without the risk of destroying the process itself and the adjacent parts: both jugals are imperfect, being broken off (as shewn in the profile view of the skull) immediately after their descent from forming the post. orbitary apophysis: the canines are wanting, but their alveoli are very distinct, though small for the size of the head; this circumstance, in conjunction with the minor development of some parts of the occiput when compared with other specimens, indicates the sex of the cranium.

With the view of obtaining the difference of proportions consequent on differences of sex, the measurements which form the third column of the subjoined table were inserted; the half palate of the cranium from whence they are derived is given at fig. 5, Pl. B, but the occiput and nasal bones being imperfect, it was not deemed necessary to delineate the specimen either in plan or profile.

The second column of the table is occupied by the proportions deduced from the dimensions taken upon the cranium of the sow; and the first column by those obtained from the head of a wild boar killed in the neighbourhood of *Hansi.* These two skulls denote, by the state of their molar teeth, very similar ages, the existing being but little younger than the fossil species; they are therefore well adapted for a comparison.

	Existing species.	Fossil species, Female.	Fossil species, Male.
Space occupied by seven molars measured on mesial lines,	1,000	1,000	1,000
From lower edge of foramen magnum to extremity of intermaxillary,	2,672	2,586	..
Space between the 9th molars at their anterior,	0,210	0,193	0,257
Ditto ditto 1st ditto,	0,371	0,356	0,418
Distance from 1st molars to extremity of intermaxillary,	0,858	0,680	
Ditto from lower edge of occipital foramen to posterior edge of 7th molars,	0,825	0,922	
Ditto from summit of occiput to extremity of intermaxillary,	3,267	2,940	
Breadth of frontal plane at post. orbitary apophysis,	0,876	0,831	0,928
Ditto of parietal plane at narrowest part,.	0,358	0,241	0,301
Greatest breadth across zygomatic process of temporal bones,	1,323	1,280	
From anterior of orbit to extremity of intermaxillary,	2,079	1,934	
From anterior of orbit to point of post. orbitary apophysis,	0,362	0,317	
Diameter of orbit perpendicularly to line of molar,	0,365	0,280	0,290
From point of post. orbitary apophysis to lower edge of jugal,	0,562	0,553	
Height of occiput from lower edge of occipital foramen to summit,	1,073	0,893	
Breadth across occipital condyles,	0,487	0,449	

Having only one specimen of the existing species, we shall draw no conclusions from the difference of size observable in the two species, as shown by the table of dimensions which closes this paper; but, confining ourselves to the discordances displayed by the above table, in which the length of space occupied by the seven molars is chosen as the unit of comparison, shall notice the following circumstances.

The molars with reference to the length of the head as measured from the foramen magnum to the extremity of the intermaxillaries, occupy more space, and are situated at a greater distance from the foramen magnum; there is, consequently, a less interval between the anterior false molar and the extremity of the intermaxillaries in the fossil than in the existing species: the palate is also somewhat narrower.

The mesial line of the occiput is in the fossil nearly perpendicular to the plane of the palate, agreeing in this respect with the cranium of the hog which forms the subject of Cuvier's description: but in the wild hog of *Haridnah* this mesial line makes an obtuse angle with the palatal plane; thus causing the dimension from the crest of the occiput to the anterior extremity of the intermaxillaries to be proportionately greater than in the fossil.

It will be observed, that the male, with exactly the same space occupied by its molars as by those of the sow, has a greater frontal and parietal, breadth of upper plane of the head. In both fossils there is, in the frontal plane, a total absence of convexity: as this plane ascends, there is a tendency to concavity, in consequence of the parietal crests being more strongly marked than in the existing species, and thus producing the appearance of a gentle hollow where in the common wild hog there would be a gentle swell.

The orbits are in the fossil proportionately less, situated higher, and more forward in the head; their horizontal is greater than their perpendicular diameter, whereas in the existing species these are nearly equal: the post. orbital apophyses of the frontals are not so salient, and those of the jugal bones are less distant from the anterior of the orbit than is the case in the existing species.

Considering the sex of the fossil cranium, the saliency of the zygomatic arches correspond in the two species.

On reference to the table of measurements, it will be seen that the occiput of the specimen third in the table is, in consequence of having belonged to a male, larger than that of fig. 1, Plate XXXIV. The specimen here alluded to possessing only one molar, could not be introduced into the foregoing table of proportions: supposing, however, the space occupied by its molars to have been equal to that of fig. 1, Plate XXXIV. and fig. 5, Plate B, the height of this occiput yields a proportion of 1.071, which is very similar to that obtained for the existing species. The breadth across the condyles is comparatively less in the fossil; but the transverse breadth of the occiput at the broadest part is more developed than in the existing species.

No sutures can be traced in the fossils. From the foregoing remarks it is evident that in several respects the species differ. We shall now proceed to examine the dentition, which presents a few modifications worthy of notice.

Upper jaws. The plane of the palate extends backwards behind the seventh molars, even farther than in the common hog.

The teeth correspond in number with those of the existing species, the incisors being $\frac{6}{6}$ canines $\frac{1}{1}$—$\frac{1}{1}$, molars $\frac{7}{7}$—$\frac{7}{7}$.

With exemplars of the earlier stages of the dentition in the upper maxillaries, we are not well provided: a small fragment containing the 3rd and 4th molars but slightly worn, shows that the 4th milk tooth resembled that delineated by Cuvier in his Plate 1, fig. 6; but the 3rd molar, though composed of similar parts, is a little longer

Plate B

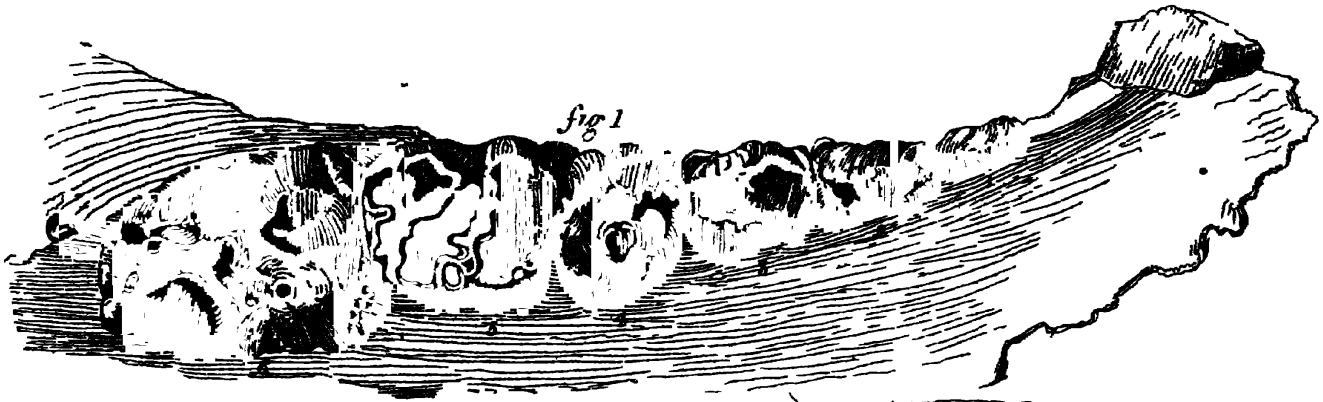
fig 1

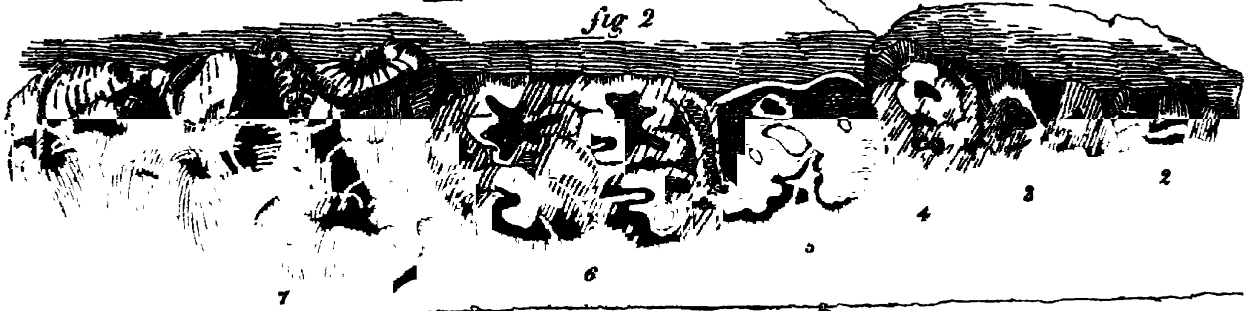
fig 2

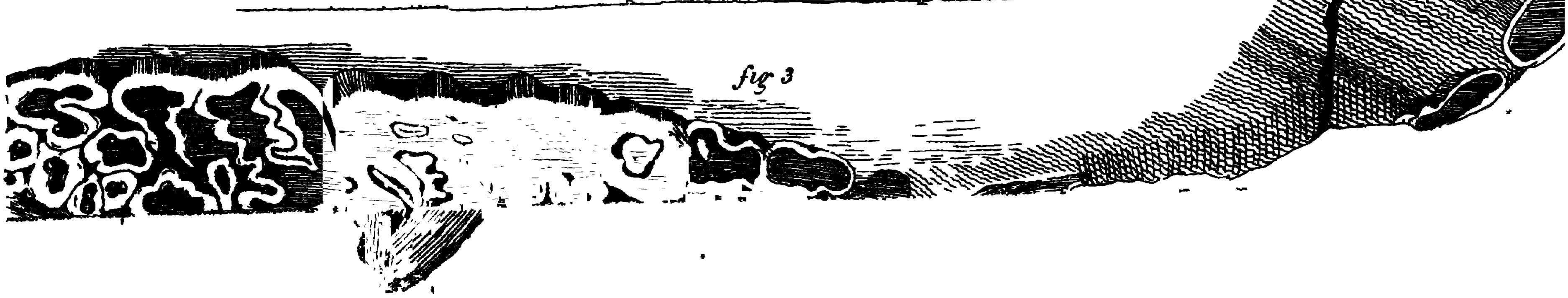
fig 3

and more tapering than the one in fig. 6. Between this the initial step in the dentition, and that in which the 6th molar is making its appearance, we have none of the intervening stages. A cranium which has not been drawn in consequence of the mutilation of all the molars except the 5th, shows the 6th tooth in the act of cutting the jaw: the anterior extremity of the intermaxillary being broken off, the incisor teeth are not perfect, but by the fracture the permanent incisors are in part laid open, so that the milk ones must either have already fallen or have been on the point of so doing: the latter is the most probable, as the lower jaw of this cranium, of which fig. 2, Plate C, is a representation, has the first set of incisors still in the jaw, though much worn; of course the state of detrition of the molars of the upper corresponds with that of the teeth of the lower jaw; the 4th molars are very much worn, the 5th has commenced to be in use, and the 6th is showing the summits of its collines; it appears to be during the progressive wear of the 5th and the descent of the 6th molar that the milk teeth are shed and replaced by the permanent ones; for fig. 1, Plate B, which represents the right half of a specimen, has no vestige of the milk teeth, but shows the permanent molars Nos. 1, 2, 3, 4, and 6 unworn.

As the animal increased in age and the 7th molar gradually descended, the teeth already in use assumed the appearance exhibited by fig. 2, Plate B, which represents the left half of a fossil upper jaw: this and the foregoing specimen, fig. 1, show that the 1st, 2nd, 3rd, 4th, 5th, 6th molars, excepting in size, correspond with those of the existing species, each tooth being compounded of the same parts, even to the small external interstitial pillars of the 5th and 6th. The 7th is in fig. 2 quite untouched, only the anterior portion of the tooth having, in fact, been exposed; although in consequence of the breaking away of the posterior part of the specimen the whole of the molar is now exposed. Compared with a germ of the existing species, it is found to be composed of analogous parts, the general shape of the fossil tooth being at the same time modified in consequence of the greater size to which the posterior collines or mamillæ attain: hence the tooth is comparatively longer and less tapering.

Fig. 5, which represents the left half of a fossil cranium, shows the 7th molar in great part brought into use, and the corresponding progress in the detrition of the other teeth. In fig. 3, Plate B, which is a view of the left half of the palate of the cranium fig. 1, Plate XXXIV., the whole of the last molar has been brought into use. The 1st molars are in this specimen mutilated, the others evince the wear due to a more advanced age than that to which the fossil fig. 5 had arrived.

Fig. 4 is the left half of a fossil cranium, in which the two rows of teeth have accidentally worn irregularly; the left side is given, being the one in which the enamel curves of the last molar have assumed forms which, on comparison with the foregoing specimens, will be found slightly to differ. The corresponding tooth in the right maxillary is both considerably longer than its fellow, and bears a greater similarity to those of the other skulls. The canines of the male were large and ribbed on the upper surface, but the fossil upper jaws presenting none perfect, their shape and direction are not ascertainable: a detached fragment indicates a wear similar to that which occurs in the tusk of the wild hog: from the lower jaws little can be deduced, fig. 3, Plate XXXIV., being the only adult one which possesses the canines perfect. This specimen would have accurately indicated the wear had it been possible to clear the canine of a thin hard coating of the matrix, which, though not sufficiently thick to affect the general shape of the tusk, conceals the worn, and does not allow it to be distinguished from the unworn, surface.

The canines of the female were small, as may be seen by the alveoli of fig. 3, Plate B.

The incisors in fig. 3, Plate B, are much used: only four are visible; the matrix, which cannot be altogether cleared from the anterior of the palate, probably conceals the alveoli of the posterior incisors.

Lower jaws. The early state of the milk teeth when the 4th or tripartitioned molars is commencing to be used, is exhibited in the fragment of which fig. 1, Plate C, is a representation; the 5th molar is also here seen prior to undergoing detrition.

The next stage exemplified by a specimen, is that in which the 5th is a little worn; the 3rd and 4th are a good deal so, and the 6th is just showing the tops of its collines; the central early incisors are much used, but not yet shed; the posterior ones are already replaced by their permanent successors, and the canine is showing its point: this jaw, as before remarked, was found together with its cranium.

By the time that the 5th molar is much used, and the 6th a little so, the milk teeth are all cast, and the permanent ones in use. Fig. 3, Plate C, exemplifies this step; here the 7th molar is half developed, the 2nd, 3rd, and 4th are slightly abraded; the canine, which is broken at the point, rises with a gentle divergence, and instead of the triangular section observable in the tusk of the existing species, has one nearly elliptical, being only somewhat flattened at its posterior edge.

The specimen, not coming from an adult animal, affords no trace of any friction having commenced to take place between the upper and lower canines, the latter being intact: in this respect the fossil corresponds with the existing species, in which, to judge from a skull in our possession, the canines do not meet until the development of the 7th molar. •The posterior incisor is present in neither half of the jaw,—a circumstance which fig. 4 proves to be accidental, and that the shape of this incisor is peculiar and distinctive. The central incisors are large, and protrude more horizontally than in the existing species. The right side has been crushed towards the left side of the jaw, so that the angle formed by the two halves at their symphyses cannot, from this specimen, be ascertained.

Fig. 5 is a fragment in which the 7th molar is nearly clear of the jaw, and has its anterior portion a little worn, but the central and posterior parts untouched. Nos. 3, 4, 5, and 6 are of course in a more advanced state of detrition than is the case with those of fig. 3.

The next condition illustrated is that in which the 7th molar is completely developed from the maxillary and in use; No. 6 is much worn, No. 5 nearly obliterated, and Nos. 2, 3, 4, and even No. 1, are in progressive wear. Fig. 4, which illustrates this state of the teeth, is from a nearly perfect fossil jaw; the specimen has lost the left condyle, and has the parts adjacent to the right one broken off, as shown in the profile view fig. 6; the left canine is snapped off close by the bone, and thus presents a sectional view: the left hind incisor, though not actually affixed to the specimen, was found in the same block,—a fact which in connection with the general state of the specimens, argues quiet deposition.

The molars of the lower jaw, like those of the upper, bear a close resemblance to those of the existing species; the incisors and the canines are, as above noticed, distinctive; and by reference to the table of dimensions it will be seen that the symphysis is in the fossil shorter in comparison to the length of the jaw, and the angle formed by the two sides is also less acute than in the common wild hog.

From the form of the cranium, the shape of the canines and incisors, and the other points in which the fossil differs from the existing species of the country, a specific difference may be inferred; for the dissimilarity, although less than that which occurs between the *Babyrussa*, the *Larvatus* and the *Sus scrofa* or common hog, is too remarkable, particularly in the shape of the canines of the lower jaw, to admit of the fossil being considered as a mere variety of the *Sus scrofa*.

Besides the foregoing fossil species, the existence of another is indicated by a cranium, of which fig. 6, Plate B, represents the left half of the palate : the fossil is unfortunately imperfect; the molars of the right maxillary are all broken, and of those on the left side the 6th and 7th are alone perfect. These are smaller than the analogous molars of the former,—smaller even than those of the existing species, and also present other differences besides those of length and breadth : their detrition does not take place in the same manner; for the 8th molar is but little worn, notwithstanding that the 7th is fully developed; in the larger fossil species the 6th would have been much worn down. The 9th molar resembles in its tapering form that of the common hog, but is posteriorly much less complicated, fewer tubercles entering into its body; it is not in the fossil quite perfect, one of the anterior collines being broken off : there is, however, sufficient of the tooth to warrant these remarks. The 6th molar is composed of the same number of collines as that of the common hog, but these, as also the inner side of the tooth, generally are less channelled. The head appears to have been short, for the nasals gain breadth more rapidly as they ascend, and the anterior extremities of the channels from the foramina on the frontals are perpendicularly over the 3rd, instead of being over the anterior of the 6th molar, as in the *Sus scrofa*. The occiput being broken off, the length of the head can only be guessed by paying attention to these minor considerations.

The above specimen is the only one in our collection of this variety; we shall therefore content ourselves with noting its existence amongst the fossil species; and in the event of further discoveries adding to its exemplars, we shall recur to the subject.

Measurements of Lower Jaws.		Existing species.	Fossil, Fig. 4, Pl. C.	Fossil, Fig. 3, Pl. C
Length from post. of ramus to anterior extremity of symphysis, ...		10,62	11,65	..
Ditto of symphysis on mesial line, ...		3,25	3,27	3,00
Space occupied by seven molars, ...		5,40	6,15	..
Molars measured along their centres, ...	1st.	0,30	0,35	0,35
	2nd.	0,41	0,52	0,50
	3rd.	0,48	0,57	0,62
	4th.	0,52	0,60	0,70
	5th.	0,51	0.50	0,71
	6th.	0,76	1.05	1,23
	7th.	1,53	1,94	..
Greatest breadth,	1st.	0,13	0,21	0,20
	2nd.	0,18	0,27	0,27
	3rd.	0,27	0,33	0,36
	4th.	0,36	0,45	0,51
	5th.	0,47	0,57	0,54
	6th.	0,60	0,69	0,72
	7th.	0,66	0,76	..

Table of Dimensions.

Measurements of the Cranium.	Existing species.	Fossil, Fig. 1, Pl. 34.	Fossil not drawn.	Fossil, Fig. 5, Pl. B.	Fossil, Fig. 1, Pl. B.	Fossil, Fig. 2, Pl. B.	Fossil, Fig. 6, Pl. B.
	In.	In.	In.	In.	In.	In.	In.
Space occupied by the 7 molars, taken on mesial line,	4,52	5,17	..	5,17	..	..	..
From lower edge of foramen magnum to anterior extremity of intermaxillary,	12,08	13,37	..	..	..	..	..
Space between 7th molars at their anterior,	0,95	1,00	1,06	1,33	..	..	..
Ditto ditto, 1st ditto,	1,68	1,84	..	2,16	..	..	..
Distance from 1st molars to anterior extremity of intermaxillary, taken on mesial line,	3,88	3,52	..	..	..	..	..
Ditto from lower edge of occipital foramen to posterior edge of 7th molars ditto,	3,73	4,77	4,60	..	..	..	..
Ditto from summit of occiput to extremity of intermaxillary,	14,77	15,20	..	..	..	..	..
Breadth of frontal plane at post orbitary apophysis,	3,96	4,30	4,80	4,80	..	..	..
Ditto of parietal upper plane at narrowest part,	1,62	1,25	2,00	1,55	..	..	..
Greatest breadth at zygomatic arches,	5,98	6,62	..	..	..	..	..
From anterior of orbit to extremity of intermaxillary,	9,40	10,00	..	..	..	..	..
From anterior of orbit to point of post. orbitary apophysis,	1,64	1,64	1,78	..	..	..	..
Diameter of orbit perpendicularly to palatal plane,	1,65	1,45	1,40	1,50	..	..	..
From point of post. orbitary apophysis to lower edge of jugal,	2,54	2,66	2,94	..	..	..	..
Height of occiput from lower edge of occipital foramen to summit,	4,85	4,62	5,54	..	..	..	..
Breadth across occipital condyles,	2,20	2,32	2,24	..	..	..	..
Length of molars measured along their centres, ... 1st.	0,34	0,30	..	0,36	0,40	..	..
2nd.	0,43	0,47	..	0,43	0,49	0,52	..
3rd.	0,44	0,47	..	0,45	0,54	0,52	0,41
4th.	0,38	0,45	..	0,56	0,54	0,49	0,41
5th.	0,61	0,52	..	} 1,35	0,80	0,74	0,51
6th.	0,77	0,87	..		1,24	1,29	0,74
7th.	1,45	1,97	2,03	2,04	..	2,03	1,02
Breadth of molars measured across anterior at base, on broadest parts, ... 1st.	0,21	0,27	..	Breadth cannot be accurately taken, enamel destroyed.	0,18	..	..
2nd.	0,26	0,31	..		0,34	0,31	..
3rd.	9,33	0,33	..		0,44	0,43	0,31
4th.	0,64	0,55	..		0,54	0,60	0,48
5th.	0,62	0,68	..		0,70	0,60	..
6th.	0,76	0,85	..		0.80	0,84	0,61
7th.	0,94	1,00	..		..	0,97	0,70

Reference to Plates.

Plate XXXIV.—Plan and profile views of fossil cranium, and plan view of a lower jaw.

Pl. XLIV. { B.—Series of half palates to illustrate dentition of upper jaws.
C.—Series of half and entire lower jaws.

VII.- -*Note on the occurrence of Volcanic Scoria in the Southern Peninsula. By Lieut.* Newbold, *A. D. C.*

I have the honor to present to the notice of the Society, specimens of a calcareous and siliceous *scoria* forming the substance of a small hill at *Búdígúnta*, near *Courtney*, about 11 miles west of *Bellary*. This hill is situated close to the road, at the summit of a small pass over a range of hills running S.E. by which it is embosomed. Its apparent height is about 40 feet—circumference, 420 feet.

The summit is rounded, and surface partially covered with long dry grass; amid which project in every direction masses of *scoria*, passing round the hill in almost regular succession like steps. Towards the top the *scoriæ* appear to be more friable—the base is cavernous, and the masses more vitreous on their surface, and stalactitic in shape. The hill when struck by a heavy stone or the heel of a booted foot emitted a sound as if hollow. Similar sounds were produced in riding a horse over the base. I found two pieces of the *scoria* several hundred yards from the spot: it is, however, probable that these may have been conveyed thence by the traveller. On the summit I picked up a piece of *clink-stone* and one of hornblende rock: the latter appeared to have been excavated by art. Around the base masses of *scoria* intermixed with the schistose sandstone, greenstone, and quartz of the surrounding formation were strewn together, with fragments of trap and iron ore.

The bed of the rivulet that washes the foot of the pass I found to be composed of greenstone. A partial stratum of *kankar* is here met with, covered with alluvial soil.

The surrounding hills are greenstone slate, in which minute scales of mica are found disseminated, capped by a schistose sandstone. The mound of *scoria* has from a distance a singular cineritious appearance, strongly contrasted with the ferruginous tint of the surrounding hills. By many it has been thought of volcanic origin, but I could discover nothing like a crater; nor any traces of lava, obsidian, augite, olivine or other volcanic matter.

The oldest natives can give no account how these *scoriæ* were accumulated, beyond the vague tradition founded on an *episode* in the *Mahabhárat*, of their being the burnt bones of a *Racsása* of a former age (*Dwápar Yug*); nor am I aware that such *scoriæ* are produced by any furnace used in the country in present times.

Buchanan, in his geological account of the range of hills from *Rajmahal* to *Burdwan*, describes a calcareous matter, in mass, called *Asurhar*, or giant's bones.

The similarity in the names given by the natives to these two substances (*Racsása* also signifying a giant) has struck me; although BUCHANAN describes the *Rajmahal* formation as deposited from water; whereas the specimens now sent appear to have undergone the action of fire.

P. S. Since writing the above I have received a letter from the President of the Madras Hindu Literary Society, CAVELLY VENKATA LACHMI'A, who informs me that there are mounds of *scoriæ* of a similar description at *Búdibetta* near *Chittledrúg*, at *Búdihal*, in the *Mysore* country, and at *Búdilippa* in *Súndah*, near the *Nuggur* frontier. Regarding the origin of these ashes he gave no further account save the local traditions; viz. that some were the ashes of religious sacrifices performed by the holy *Rishís* in their hermitages, and some the funeral piles of remarkable heroes and other noted persons.

Búdigunta, the name of the place whence the specimens sent you were procured, signifies in the Canarese language the "hill of ashes."

VIII.—*Postscript to the account of Ursitaxus printed in the 19th Vol. of Researches As. Soc. By* B. H. HODGSON, *Esq.*

I have just procured another very perfect skull of the Ursitax, which exhibits the same formula of molar dentition as that described in my paper or $\frac{4.4}{4.4}$.

It is the cranium of a mature subject, but less old than the preceding, and I am thus enabled to correct that portion of the generic character which ascribes an almost ursine flatness to the crowns of the molar teeth.

In the present subject the coronal processes of those teeth are distinctly salient, with an obtusely conical form. A similar process rises from the inner heel of the great carnivorous tooth, above; nor is the transverse tubercular, next to it, wholly without symptoms of such a process.

The generic character should be corrected as follows:

'Cheek teeth $\frac{4.4}{4.4}$, strong, broad, low, and furnished on the crowns with obtusely-conical processes: the tubercular of the upper jaw, transverse, narrow, sub-parallelogramic, smaller than the carnivorous tooth, and essentially a grinder: no tubercular in the lower jaw,' et cæt. sicut prius scripta.

It has been suggested to me that our animal is a Glutton or a Ratel. But the dentition of the former, according to the Regne animal, is $\frac{5.5}{6.6}$; of the latter is $\frac{4.4}{5.5}$; and I possess several species of both conforming to those formulæ. The peculiar dental system of Ursitaxus is in harmony with *other* material peculiarities of structure; and the animal therefore seems abundantly entitled to generic distinctness.

As to the *species*, that is probably identical with the Ursus Indicus of SHAW, the Indian Badger of PENNANT, and the Biju of Hindusthan, but which still wants (I believe) a scientific name. I suppose, therefore, mine of Inauritus will be recognised, unless we are to persist in incumbering the science with the vague names and descriptions of a half informed age.

IX.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 2nd November, 1836.

The Honorable Sir EDWARD RYAN, President, in the chair.

Mr. G. F. MCCLINTOCH, proposed at the last Meeting, was balloted for, and duly elected a Member.

H. WALTERS, Esq. C. S., Dr. J. M. BRAMLEY, Dr. DRUMMOND, Newab TAHAWUR JUNG Behadúr, and Sháh QABIR U'DI'N were proposed by Mr. JAMES PRINSEP, seconded by Sir EDWARD RYAN.

Dr. JACKSON was proposed by Dr. PEARSON, seconded by Sir EDWARD RYAN.

Read a letter from Mr. VINCENT TREGEAR, acknowledging his election as an associate member.

Read a letter from Mr. C. BROWNLOW, returning thanks for the Society's patronage of the *Alif Leila*, and agreeing to the stipulation for the deposit of a file of the sheets, as printed, with the Secretary.

Read a letter from J. C. C. SUTHERLAND, Esq., Secretary to the General Committee of Public Instruction, requesting to know at what price the Society would supply twenty-eight copies of the *Naishadha* and of the *Rája Tarangini*, required for the use of the Government Sanscrit College.

Mr. W. H. MACNAGHTEN moved that the books should be given gratis if intended for deposit in libraries, as the encouragement thus given to the study of these works would promote the sole object the Society had in view in completing their publication. The Secretary explained that they were required as class books; that the present application would doubtless be followed up by a constant periodical demand for this and other works; that when he guaranteed the Society against any risk in undertaking to finish the suspended volumes, he calculated on the necessary school demand for many of them as one of the means of repayment; and the prices fixed were calculated only to cover the gross amount expended in their completion: he proposed furnishing them at a reduced price. Sir BENJ. MALKIN and other Members objected to a reduction of price, and it was resolved by a large majority that the ordinary selling price should be charged.

The Secretary submitted correspondence with the Secretary to the Committee of Public Instruction, relative to the Oriental works deposited for sale at the London Booksellers, which the Society's English Agent from a misconception had authorized to be transferred to the Society's account, and to be sold at reduced prices.

The transfer had been countermanded as soon as known; but the Committee refused to sanction any sales that might mean time have been made at the reduced prices, awaiting the report of the circumstances from their bookseller.

Read a letter from the Secretary of the Royal Academy of Marseilles, acknowledging receipt of the Researches and Journals presented last year.

Shah Qabir u'di'n applied to the Society to be allowed the loan, for the purpose of taking a copy, of a very valuable manscript of the Koran in the Library, depositing 250 rupees, the price at which it had been purchased by the Society.

Resolved, that he should be permitted to employ *kátibs* in the apartment to take the copy, but that the volume could not be lent out for such a purpose.

He also requested two copies of the last three volumes of the *Alemgírí*, of which the three first volumes had been supplied gratis to the *Susseram Madrassa* by the Education Committee.

Resolved, that this request be complied with.

Library.

A letter was read from the Secretary to Government, General Department, forwarding for deposit in the Library of the Asiatic Society the undermentioned 95 volumes, being a set of the Reports and Publications of the Commissioners of Records, of which three copies had been recently sent out (as printed on the reverse of the title page) "for perpetual preservation in some public library of the Bengal Presidency."

Report from Commissioners on Public Records, 1 vol.

Record Commission, Scotland; Correspondence of C. P. Cooper, Esq. Secretary to the Board, with Thomas Thomson, Esq. Deputy Clerk Regulation, 1 vol.

Reports from the Commissioners on the Public Records of Ireland, 3 vols.

La Commission Des Archives d'Angleterre, 1 pamphlet.

Public Records, the public advantages of entrusting the Records of the Exchequer, &c. 1 pamphlet.

Nonarum Inquisitiones in Curea Scaccarii, 1 vol.

Rotuli Hundredorum, 2 vols.

Valor Ecclesiasticus, 6 vols.

Inquisitionum Post Mortem Calendarium, 4 vols.

Manuscripts in the Harleian Collection, 4 vols.

Placita de quo Warranto, 1 vol.

Domesday Book, 2 vols.

Domesday Index, 1 vol.

Domesday Supplement, 1 vol.

Sir H. Ellis's Introduction and Index to Domesday, 2 vols.

Placitorum Abbreviatio, 1 vol.

Ducatus Lancastriæ, 2 vols. Pars prima and secunda, and Pars quarta.

Rotuli Scotiæ, 2 vols.

Rotuli Litterarum Clausarum, 1 vol.

Rotuli Litterarum Patentium, 1 vol.

Rotulorum Originalium, 2 vols.

Manuscripts in the Lansdown Collection, 1 vol.

Inquisitionum in Officio in Hibernia, 2 vols.

Rotulorum Patentium et Clausorum, 1 vol.

The Acts of the Parliaments of Scotland, 10 vols. (first volume wanting.)

Registrum Magui Sigilli, 1 vol.

Proceedings in Chancery, 3 vols.

Calendar to Pleadings, &c. 1 vol. marked Vol. II.

Fœdera, 6 vols.

Parliamentary Writs, 4 vols.

Letters sur la Cour de la Chancellerie d'Angleterre, 1 vol.

Letters to Charles Purton Cooper, Esq. of Lincoln's Inn, Barrister at Law, on the appointment of a Permanent Judge in the Court of Chancery in the place of the Lord Chancellor; 2 pamphlets.

Substance of the Speech of **Charles Purton Cooper**, Esq. as Counsel for the Rev. **Charles Wellbeloved**, in the suit of the Attorney-General versus **Shore**, instituted in the High Court of Chancery, respecting Lady **Hewley's** Foundations; 1 pamphlet.

Memoria du Commissaõ dos Arquivos du Gran Bretanha dirigida aos Cartorarios Bibliothecarios e Antiquarios de Portugal, pello que resputa aos trabathos e Exames da mesma Commissaõ; 1 pamphlet.

Proceedings and Ordinances of the Privy Council of England, 5 vols.

Rotuli Curiæ Regis, 2 vols.

Rotuli de Oblatis et Finibus in Turri Londinensi, 1 vol.

Rotuli Selecti Ex Archivis in Dom. Cap. Westm. 1 vol.

Excerpta è Rotulis Finium in Turri Londinensi asservatis Henrico Tertio, 1 vol.

Fines 7, Ric 1. 16 Johan, 1 vol.

Rotuli Normanniæ in Turri Londinensi, 1 vol.

Statutes of the Realm, 12 vols. including 2 vols. of Index.

Manuscripts in the Cottonian Library, 1 vol.

Calendarium Rotulorum Patentium in Turri Londinensi, 1 vol.

Calendarium Rotulorum Chartarum et Inquisitionum ad quod damnum, 1 vol.

Taxatio Ecclesiastica Angliæ et Walliæ, 1 vol.

Read a letter from Mr. H. A. **Hornneman**, forwarding for presentation a copy of the first number of the Numismatic Journal, on behalf of Mr. **John Yonge Akerman**, F. S. A. the Editor.

Meteorological Register for September, 1836, was presented *by the Surveyor General.*

Second Annual Report of the Statistical Society of London, presented *by Dr. D. Stewart.*

Literary and Antiquities.

Read a letter from H. T. **Prinsep**, Esq. Secretary to the Government of India, General Department, forwarding copy of a report furnished to the Government of Bombay from Colonel **Chesney**, of the proceedings of the Euphrates expedition, in its various departments.

[The substance of this report is published below.]

A memoir on the Antiquities of Bamián was submitted by Mr. **Trevelyan**, on the part of Mr. C. **Masson**.

The same member presented also a notice by **Munshi' Mohan La'l**, of *Uch Sherif*, a town near the junction of the five streams in the *Panjáb*, celebrated as the place of sepulture of many Mahommedan saints.

Mr. S. G. **Heatly** presented through Dr. **Corbyn**, the first of a series of mathematical essays on the use of functions in geometrical analysis.

Physical.

A large fossil fragment of the acetabulum of an elephant was presented by Dr. **Spilsbury**, found by him at *Sigouni*, the place where Captain **Sleeman** discovered the first indications of the Nerbudda fossils.

Brigadier **Anburey**, Engineers, presented on the part of Mr. **Swetenham**, some incrusted petrifactions of leaves from the calcareous springs in the Dehra Dun.

A specimen of the red-billed parrot (*Psittacus Sinensis*) was presented by Dr. **Burlini**, and a woodpecker by the curator, both mounted in the museum.

The Secretary read the following extract of a private letter from Dr. W. **Griffith**, dated Sadiya, Assam, 12th Oct.

"I have much pleasure in informing you that I have lately completed the arrangement of the collections of the Musci and Hepaticæ made during our late deputation into Assam. The collection of the former amounts to 154 species, or to about an eighth of the whole known number. It includes twenty-seven genera, of which I have ventured to characterise two as new. That of Hepaticæ includes forty-eight species, of which thirty-one belong to *Jungermannia* alone, and ten genera, of which five appear to be new. Almost the whole of both these collections were made by myself on the *Khasiya Hills* between *Chur-*

ra Punji and *Nunklow*, and within a period of seven weeks. Both these orders have hitherto been almost totally neglected by Indian Botanists; and the greater part of the few that have been described seem to have been sent from *Nipál* by the Honorable Mr. Gardiner. Hence, owing to the impossibility of obtaining advice, and as my situation obviously precludes me at present from consulting the requisite authorities, I have determined on sending the MSS. and drawings to England, accompanied with a complete series of both collections. By the adoption of this plan the stability of my very numerous new species will easily be determined*."

X.—*A General Statement of the labors and proceedings of the Expedition to the Euphrates, under the command of Colonel* Chesney, *Royal Artillery, F. R. S.*

The object of the present communication is not to anticipate the interest which must be felt, and especially by the members of the Geographical Society, as well as other public bodies, not only in the progress of the Expedition to the Euphrates, but also in the results obtained to science and general knowledge; for, to render these of any real value, they must be accompanied by the details of the means by which they were acquired. It is rather, therefore, with a view to the exhibition of how those means have been hitherto applied, and how the capabilities of the Expedition have been directed, that the present statement is made; not, however, omitting those details which a brief notice of this kind will admit, when touching upon the labour, the progress, and the present condition of the enterprize itself.

The voyage to *Malta* from *Liverpool* occupied a period of twenty-nine days, a great part of which time was taken up in working out the details, and consolidating the original plans of our commander. Among the scientific labours, independently of questions of general navigation and drilling the men, were the rating of the chronometers, observations in meteorology, the temperature of the sea, and researches in natural history.

At *Malta*, some time was devoted to the determination of the intensity of magnetic forces, and the amount of the dip of the needle. The cylinders used for the former experiments consisted of two pair that had been tried by Captain Sabine in *Limerick*, and another obtained through the kindness of Professor Lloyd, T. C. D. and tried at *Dublin* previous to departure. The whole set being subsequently experimented upon in *London* by Lieut. Murphy, R. E. and also at *Liverpool.*

An exploratory tour was also made in the interior of the islands, *Malta* and *Gaza*, with the view of recognizing in a general way their geological structure and natural productions. Some fossil shells of interest were obtained, also the plants of the season (March), and some species belonging to the classes *Tunicata*, *Acaleppa*, *Malacodermæ* and *Polypi.*

During the stay at *Malta*, Colonel Chesney was much occupied with the general objects of the Expedition, more particularly about the construction of flat boats. The *George Canning* had been separated from the *Alban* Steamer her consort, by rude weather, off *Cork*, and it was found impossible to remedy this loss at the Mediterranean station; but the Admiral, Sir Josias Rowley, allowed the *Columbine* sloop to accompany the Expedition to the mouth of the *Orontes;* and there was certainly every reason to rejoice in this arrangement; for not only was the *George Canning* taken in tow by the brig at all times when the weather permitted, but Commander Henderson and his officers secured the gratitude of every member of the Expedition, by the most efficient and zealous services in landing the stores.

The difficulties and opposition to the landing of the stores are already known from the various reports that have reached England. Success was only obtained here in the first instance by the bold step of an immediate landing without a reference to the authorities of the country, and by exposing and remonstrating in the second, against the system of subterfuge carried on by the Syrian Government towards the expedition; and its commander visited Ibrahim Pacha at *Tripoli*, in the hope of persuading him to give, at least for a time, that assistance which had been promised unreservedly by the Viceroy himself.

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* We hope soon to receive from the Tea Committee some account of Dr. Griffith's previous labors. We hear that the several reports of Dr. Wallich, Dr. Griffith, and Dr. McClelland have been some time sent in.—Ed.

The connexion between the *George Canning* and the shore having been established by means of an hawser extending from the ship across the bar of the *Orontes*, a distance of 1200 yards, parties were sent on shore from the *Columbine* and *George Canning* with tents for their accommodation, and the disembarkation was carried on with such spirit and activity, that the site designated as "Amelia Depôt" soon became a little camp with a very mixed aspect, replete with bustle and useful occupation. The bar at the mouth of the river was at times dangerous, and on one occasion Commander Henderson with his boat's crew narrowly escaped a watery grave.

The observatory being now fixed, Lieutenant Murphy applied himself to astronomical observations, more especially with the fine transit instrument that had come out with the Expedition. The survey was soon afterwards began under Lieutenant Murphy, Mr. Thomson, and Mr Stenhouse, (who was sent by the Admiral) at *Lattaquia* (Laodicea), but was limited to a determination of the outline of the coast with its soundings, and an examination of the coast itself. Mr. Ainsworth also accompanied the party for purposes of natural history. The sites of *Heracleum* and *Possidium* were recognized. On their return an excursion was made to the summit of Pliny's wonder, *Mount Cassius* or *Gebel.* The succession of the various forms of vegetation was noted. The party bivouacked near the summit, on which, April 28th, there still remained some patches of snow. The results given by the Barometer, which was observed at various heights, compared with a register kept at the same time by Mr. Eden in the Depôt, coincided closely with those obtained trigonometrically by Mr. Murphy, and which gave for the elevation above the sea 5318 feet. But this mountain, notwithstanding its great height, is entirely composed of supracretaceous limestones, characterized by cones and cerithii. At its north-eastern foot is an extensive deposit of highly crystalline gypsum, and to the south-east diallage rocks and serpentines break through the same formations, accompanied by lacustrine marles and siliceous limestones.

On the 29th of April, a party consisting of Lieutenant Murphy, Mr. Ainsworth, and Mr. Thomson, left the *Orontes* in a country boat to commence the survey of the Gulph of *Scanderoon* and its neighbouring shores. The first points visited were *Arsons* and *Rhosas*. An ascent was then made to *Gebel Kaiseria*, on which they bivouacked. Next came *Scandernoon*, and in its neighbourhood Jacob's Well, the site of *Myriandros;* to the south, the pass of *Bylan*, gates of *Syria* (Ptolemy), *Amanian Gates* (Strabo), a defile in the mountains separating the *Amanus* from the *Rhosas*, and leading from *Myriandros* into the plan of *Antioch* or *Umk*.

To the north the remains of a marble gate-way, commonly called Jonas' Pillars, (*Cilicia* Gates of Ptolemy, Q. Curtius and Arrian:) this was the midnight halt of Alexander. The description of Zenophon refers to a narrow place contiguous to the sea; that of Arrian to the ascent of the hills that shut up the same plain contiguous to the sea. The latter applies itself distinctly to these ruins. Half a mile north of the Cilician Gates, is the river *Markotsaye (Kersus)*, and beyond a wall terminating in the sea with a tower. At the foot of the mountains, the *Kersus* passes between two walls near the village of *Merkets*. This is the wall and gates of Zenophon. They are built of stone. Farther north is *Byas (Baias* Anton. Itiner. *Myrcandros* of Williams' Geography of ancient Asia) and there are several populous villages between *Byas* and the *Issus (Pinarus)*. At a subsequent period, in company with Colonel Chesney, this river was examined in detail, as also the ruins of a considerable town near some hills which enclosed the Issic plain to the north-west—the *Giaour Dagh*, or *Amanus*, being the east pass of Darius, Armenian Gates of Arrian; the whole corresponding closely with the last mentioned author's description. Where the gulph runs to the west, there are ruins of forts, castles and gateways. From thence proceeding north-west by *Kurd Kulac* (Wolf's ears) *(Jordequiea* of D'Anville and Rennell) to *Missis (Mesis)* at a pass through low hills of sandstone, are the remains of a road and archway constructed in part of sandstone, but chiefly of polygonal masses of basalt and laval, which no doubt have given rise to its name, *Demir Kapon*, Iron Gate, and *Kara Kapon*, Black Gate,—the Armenian Gates of PTOLEMY; *Amanicae Pylæ* of Colonel LEAKE; Upper Armenian Gates, RENNELL; *Timour Kapon*, or the Gate of *Tamerlane*, (*Mecca* itinerary by Geographical Society of Paris.) From hence the party visited *Ayas* (*Agæ*) the mouths of the *Jihoun* (Pyramus), where an interesting examination took place of the progress of alluvial deposits. The most westerly point reached was *Karadash*, the site of *Mallus* and *Megarsus*. The whole of the party being sick, the pass of *Bylan* was the only position examined on the return to *Antioch*.

In the neighbourhood of Amelia Depôt, the points of most interest were the course of the *Orontes*, examined by Lieutenant CLEAVELAND, Messrs. EDEN, CHARLEWOOD, and FITZJAMES; and the ruins of *Selucia Pieria* also made the object of interesting researches. About the same time, various other undertakings were in progress. The gentlemen already named, in conjunction with Messrs. HECTOR and BELL, were in turns employed on different points, repairing and widening the road from the mouth of the *Orontes* to *Antioch*; a work of considerable labour, especially in making the fords over the rivers practicable for waggons. Captain ESTCOURT and Dr. STAUNTON had gone on a journey of remonstrance to the Civil Governor of *Syria* at *Damascus*,—visiting as they returned *Bualliec* and the cedars of *Lebanon*. Lieutenant LYNCH was employed in improving the line of route from *Antioch* by *Djezer haded* to *Bir*; and, lastly,

Lieutenant COCKBURN was employed (after Captain ESTCOURT's visit to RESCHID PACHA at *Diarbek*) in throwing up some slight field works, and constructing slips at a spot selected for this purpose, 1¾ miles below *Bir* on the right bank, and now called Port William.

To avoid the mischievous effects of idleness, as well as to carry the heavy weights to *Antioch* by water (when denied all other local means by Government), the *Tigris* was put together on the *Orontes* during the month of May as a working shell, in which state she was steaming experimentally, when the PACHA withdrew his outward opposition on the 3d of June. Towards the middle of that month commenced the dispatch of the light stores on camels and mules, and towards its close some trains of waggons* passed through *Antioch* carrying heavy weights, but this being found a dilatory operation, the water communication was looked to once more, along a new line which promised many advantages. The *Orontes*, the *Lake of Antioch*, and the *Kara-son*, were, therefore, examined; and upon the reports and maps thus obtained, the Commander ordered a Depôt (the 2d) to be formed at *Goozel Burge*, "pretty tower," a village on the *Orontes* 3 miles above *Antioch*, when the infinite variety of *materiel*, including the more ponderous objects, such as boilers, the eight sections (into which the *Tigris* had been divided,) diving bells, &c. were to be put on rafts, flat boats, and pontoons, in order to be transported by the *Orontes* into *Kara-soo*, (black water,) and along this navigable stream into the Lake *Owja Dengis* (white sea,) keeping along its western side on account of the deeper water, and ultimately ascending the *Ultra Kara-soo* to a spot called *Moorad Pacha*, near the Village of *Gule Bachee*, "head of the waters," a little beyond the junction of the Aswad and Yagra rivers, the whole distance being fourteen hours from *Goozel Burge*. The abundant spring called *Gule Pachee* issues out of a pseudo-volcanic mound rising out of the plain. The Bridge of Moorad Pacha is chiefly a causeway resting on the soil, but in parts supported by arches, and crossing that part of the plain of *Umk* which is most liable to be inundated, for a distance of about three miles. This plain is inhabited by pastoral and Nomade Turcomans living in tents, who are a quiet people. The ancients appear to have known in this tract the rivers Oinaparas, Arcenthus, Labotas, Ufrenus, and the ditch of Meleagrus. The actual fluents of the Lake are the *Aswad*, or *Asond*, the *Yagra* (uniting to form the *Kara-soo*) the *Aphreen* traversing the Cyrrhesteca, the rivulet of *Hareem* and the *Orontes*, but the first mentioned have various tributaries to the north, with different appellations. On the road to the valley of the *Aphreen* are some Thermal springs, El Hammam, "the Baths," issuing at the point of junction of plutonic rocks with tertiary dolomites. The waters of these springs are said to have originated with different earthquakes, and present corresponding differences of temperature.

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* Twenty-seven vehicles of different kinds were constructed at Amelia Depôt, and there were thirty-three, including the artillery waggons, from England.

It is a distance of about 111 miles across the so called "Syrian Desert" from Moorad Pacha to Port William. The first part of it is hilly but not infertile, between El Hammam and *Azass*, or Arsace Menniza of Ant. Itinerary (MSS. of Colonel Chesney). The second part from *Azass* to Port William is for the most part level, at the best undulating, containing the valleys of the *Kowick* (Chalus) and the *Sajour*. These plains are every where fertile, for the most part cultivated, and abounding in populous villages, consisting of Fellah Arabs, Kurds, Turkish tribes, and mixed races, possessing bullocks in great abundance along the whole of the direct line which passed a little way southward of *Aintab*, the ancient Antiochea ad Taurum, and now a garrisoned town of large size and some commercial importance.

The general arrangements for the transport were, that Lieutenant Cleaveland and Mr. Charlewood were to carry the boilers, &c. to *Goozel Burge*, from whence they were to proceed under Mr. FitzJames to *Moorad Pacha* by water, to be conveyed from thence to Port William by Captain Estcourt, assisted by Mr. Eden; and as there was a line of waggons connecting the boats with the sea on one side, and to the Euphrates on the other, the three portions of the grand line were simultaneously in operation, and also a fourth, viz. camels and mules, carrying the light stores direct from Amelia Depôt to *Port William* by the *Antioch* route through *DjezerHadid**. At first every thing went on well, and promised a rapid conclusion. Lieutenant Cleaveland obtained bullocks with a moderate degree of difficulty, and his ingenuity and perseverance† did the rest by removing every thing to *Goozle Burge*, where they were successively embarked for *Moorad Pacha*; but here things were immediately at a stand still, and although the strongest orders (in appearance) were constantly issued by Ibrahim Pacha, very few bullocks could be obtained even at the highest prices by Captain Estcourt, whose unwearied efforts could only secure the tantalizing but ingenious result of an abundance of bullocks along the whole line, *except the first and last stages*; consequently the boilers which had remained for ten or twelve weeks on their carriages, might have continued at *Moorad Pacha* until now, if we had not exerted ourselves to bring them on, one at a time, with our own horses, instead of bringing on a number of the heavy weights at the same time with the bullocks; and the result was, that the officers and men had to toil along the great line of route from *Moorad Pacha*, exposed for months to the great heats of noon, the chills of night, and to the baneful effects of what Humboldt expressively calls an extreme climate, the thermometer being as high as 110° in the shade, (July) and as low as 8° in the winter, during which some of the boilers were flooded, and the diving-bell actually lost in an extensive sheet of water near El Hammam. This had been in all likelihood the original object of the Pacha, and the *Euphrates* being already complete, bullocks were given to perform the impossible (as was thought), task, of bringing on the *Tigris*' boilers‡, which were warped out of the lake by manual labor, and ultimately taken to Port William by Lieutenant Cleaveland, Messrs. Eden, Charlewood and Hector, the only officers in the Expedition then effective. Not one individual officer or man employed on this enterprize escaped at least one serious illness, nor is it at all surprizing that some§ fell victims to trials so long continued, and to a climate so often replete with morbid miasma as *Moorad Pacha*, the worst of the stations: yet the malaria only proved fatal when other causes combined to render it so; nor need the splendid scenery, nor the magnificent climate of *Syria*, be approached with fear, for its malaria is not a pestilence, and the circumstances under which the Expedition was placed, toiling on lakes and rivers, dwelling in the marsh, with almost reckless exposure to the sun of the day, followed by the dew of the night, require a separate consideration; and perhaps the surprize will then be, that a greater fatality did not occur amongst a body of men (about 85), in general unseasoned, during the laborious and almost unexampled transport of two large iron vessels, which, thanks to the care of all, have since been set up*, and are now steaming with their boilers, engines, &c. quite as safe and even more perfect in their working details than when sent out of the maker's hands at *Liverpool*, notwithstanding a long journey, with all the difficulties which could be thrown in the way by the Local Government underhand.

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* Eight hundred and forty-one camels and 160 mules were employed in all, and the greater part of these caravans were stopped on the frontier by the Pacha, in order to cause delay by forcing us to bring others from the Sultan's territory.

† In addition to pullies, &c. the boilers were actually moved up the hills inch by inch with jack screws by Mr. Charlewood and Lieutenant Cleaveland.

‡ Mr. Hector found the diving bell by means of long poles, and then rolled it under water for the most part half a mile to its carriages.

§ Seven men of the Expedition and one workman.

Previous to taking medical charge at the station at *Moorad Pacha*, Mr. AINSWORTH had made an examination of the less frequented countries immediately south of *Antioch*. He crossed the mountains at *Beit El Moie* (the Daphne of POCOCKE,) and entered forests which covered a great basin of tertiary rocks chiefly cerithia limestone, silicious limestone and lacustrine marles, with gypsum every where broken up and dislocated by serpentines and diallage rocks. It is only in the valley of *Antioch*, that the Pliocene formations shewed themselves, and enabled Mr. A. to determine the period of the elevation of the plutonic rocks of the silico-magnesian series. From *Lattaquia*, he followed MAUNDRELL'S route by the country of the *Maronites* and *Gebel Kraad*, the northern prolongation of the *Ansarian* mountains, and by the valley of *Bedame*, rich in scammony *(convolvulus scammonia)* to that of the *Orontes*, which he joined at *Djezer Shogher*, the *Larissa* of GOSSELIN, and *Seleucus Bêlus* of D'ANVILLE. A Roman road led to *Koalat el Medyk*, where are ruins of a highly ornamental character. Part of the town is enclosed in an ancient castle situate on a hill; the other ruins lie in a plain part of a strong wall, and an archway still exist, and also the remains of a temple. In the adjoining lake are the celebrated black fish, the sources of a distant commerce, which were recognized to be the *Macropteronotus magur* of naturalists. From *Medyk* he visited the little centre of primitive Christianity in the mountains of *Reiha* and *Edlip*, abounding in monuments of a then new hierarchy, returning subsequently by the borders of the great plain to *Antioch*.

At this period, August 1835, Lieutenant MURPHY commenced the grand line of levels which was to be carried from the Mediterranean to the Euphrates, with reference to canals, and many other objects of deep-interest connected with science and calculated to encourage this extensive work.

Many obstacles occurred at first; prolonged malaria had unfitted all for exposure to the sun. Lieutenant COCKBURNE and Mr. THOMSON after a short exertion were both laid up. Lieutenant MURPHY was also seriously ill. Ultimately after another beginning, the last mentioned industrious officer left for *Port William*, where he was required in the observatory, and levelling was continued by Mr. THOMSON, who has just completed this important part of the original plan.

Nearly at the same time a party composed of Lieutenant LYNCH, his brother, Mr. STAUNTON, and Mr. ELLIOT, set out on a mission of a friendly and conciliatory nature to the Arabs. They visited the tribes of Welda, Aniza, Geeza, the Bore-sipahi and some of the Turcomans, from all of whom they met a favorable reception. The Aniza alone shewed a doubtful disposition, and the Bore-sipahi, one of their tributaries, wounded one of the servants severely. This hostility did not, however, appear to be directed against the Expedition so much as with the view of plundering those gentlemen who had ventured amongst them, and the Sheikh immediately offered to compromise the matter by presents, which were declined as a matter of policy, in the hope that an unsettled affair of blood may tend to keep the Aniza in better order as regards their future intercourse with the Expedition.

In the early part of January last, Colonel CHESNEY left his bed, and was actually put on his horse to prosecute a scientific journey to the *Taurus*, and part of

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* The labor fell chiefly upon Captain ESTCOURT of the 43d Light Infantry, Lieut. CLEAVELAND, Messrs. EDEN, CHARLEWOOD and FITZJAMES, R. N.

Asia Minor. He was accompanied by Lieutenant Murphy and Mr. Ainsworth, both invalids; also Mr. Staunton. The party proceeded by *Antab* to *Killis*, and thence to the Eastern acclivities of the *Amanus*, in the parallel of the *Issus*, but no passage could be effected at that season of the year. Repelled to the south, the mountains were passed by *Pagrae*, through the *Beilan* pass, to *Scanderoon*, from whence the party proceeded by the Cilician Gates and *Byas* to the plain of the *Issus*. Sufficient time having been devoted to the examination of the various questions of historical geography, connected with this most interesting district, the great road towards *Constantinople* was followed by *Demer Kapon* to *Kurd Kulac*, "the Wolf's ear," (Jardiquiea) and by the plain of *Tachakour Ova*, "the valley of the ditch." Crossing the *Gebel Elnour*, the mountain of the light, bearing on its rocky summit to the north, *Shah Merar*, "the Castle of the Serpent," and along the left bank of the *Jihoun*, *Djehan soo*, "the river of the world," to *Missis*, the ancient Mopsuestia, now almost in ruins, but once (like Tarsus) one of the chief cities of *Cilicia*. From *Missis* the party continued, cross the plain by *Adana* (head-quarters of the Pachalic) to the last mentioned town, where they found the French Consul, Mons. Gilet, engaged in excavating a monument close to the place, of great solidity, and apparently very remote antiquity. It consists of an enclosure in the form of a parallelogram, with two transverse masses of similar form at one extremity; the walls and masses were of the most solid construction, without the least appearance of any thing like a sepulchral chamber in any part of this extensive mass,—at least as low down as the level of the ground around it.

The road followed on leaving *Tarsus* led over the sub-alpine country at the foot of the *Tarsus*, consisting of tertiary rocks in great variety. Near the centre of the Tauric chain the lead mines of *Kulé Boghaz* were visited: they occur in limestone belonging to the cretaceous series, and are in the valley south of the grand pass of the same name, but worked most injudiciously. The pass itself was then examined almost to the summit level, and the party regained the more level country on the south side of the great mountains, in order to visit the town of *Sis*, and the border territories of the Sultan and Pacha. Here the inhabitants had so bad a name, that no muleteer or guide could be induced to proceed along the mountains in that direction, and whilst overcoming the difficulties made by the alarms of the people, Colonel Chesney and Mr. Ainsworth were separated from the rest of the party, and made their way to *Sis* on foot by one line, whilst Lieutenant Murphy and Mr. Staunton reached it by another; each traversing a romantic and beautiful country formed by the wooded abutments of the Taurus, and well peopled by the best disposed peasants imaginable, instead of being all robbers, as they were represented. During about 125 miles of country, composed almost entirely of tertiary sandstone, (ostracite sandstone of Kupffer,) they crossed the *Seihoun*, the *Jeihoun*, the *Corrykoon*, and several smaller, yet good sized rivers watering this interesting country, which terminate at *Sis*, the residence of an Armenian Patriarch, the third in importance at the present day, with a respectable palace, and a large convent in his charge; whilst at *Sis* an incursion was made into the Taurus and the mountain of *Kara Sis*, *Black Sis* ascended, after crossing a part of the crystalline plutonic formations. The researches were then directed towards *Anasaiba* on the plain. The ruins of the city are still extant, backed by an insulated mountain, bearing a castle of various architecture. Such solitary hills rising out of the plains are not unfrequent here, and they mostly bear castellated buildings on their summits, as *Sis Shah Meran*, *Toome*, *Anusaiba*, and others. From *Anasaiba* the party crossed the plain of the village and district of *Kars*, and there entered the mountainous country which led by *Analat* to *Marash*. The chain was not crossed without much difficulty; the narrow pathway was carried alongside, and down precipices that were very steep; so much so, that it became necessary at times to unload the horses, and carry the baggage over the most dangerous places. The culminating point of this part of the Taurus is called *Durdoon Dagh*. The chain is composed of mica slates, clay slates, with graphite or plumbago, quartz, schists, quartzites, and diorites, with uplifted limestones belonging to the supra-cretaceous series. The great and massive mountain which rises above *Marash*, and is there known by the name of

Arga Dagh consists of tertiary sandstone and limestone tilled up by and reposing on serpentine and diallege rocks, which would indicate different geographical connections. The direction of the *Arga Dagh* is nearly from SW. to NE.; that of the shistose chain of *Durdoon Dagh*, a little south of east; that of the *Giaur Dagh* (Amanus) is the same as *Arga Dagh*. Colonel CHESNEY returned to *Port William* from *Marash*, leaving directions for the remainder of the party to proceed in the direction of *Samsat*, *Orfa*, &c.; but being thrown back on *Romkala* by the swollen rivers, they returned to *Port William*, surveying the river between those places. During the whole period of their progress the positions of the principal places, ancient and modern, were determined astronomically by Lieutenant MURPHY, and careful itineraries kept, in addition to bearings taken, when practicable, with the theodolite or Kater's compass, according to circumstances. The results of these labours has been, in the first place, to connect the survey of the coast of *Lattaquia* and that of the *Issus* with that of Captain BEAUFORT; and, in the second, to join those surveys to the Euphrates. There are ample materials for laying down a map with such a degree of accuracy as will, it is hoped, enable the learned to determine many points of ancient history and geography, especially those depending upon the length of the stadium, the parasang, and other scales of measurement used by STRABO, PLINY, and HERODOTUS.

On the day following the return of the first party, another was sent out by the commanding officer to finish that part of the plan which had been interrupted. This one consisted of Lieutenant LYNCH, Mr. EDEN, R. N. and Mr. AINSWORTH. Agreeably to the instructions received, the party took up the former work at *Romkala*, proceeding from thence along the left bank, carefully surveying the river as far as *Samsat*, the birth-place of LUCIAN. The ruins of this celebrated place are just recognizable. The modern town small and poor, but the valley itself fertile, as it is described to have been in former times; and ferry-boats are still kept up to pass the river to and from *Orfa*. The course of the Euphrates from this ancient *Zengma*, to that above *Bir*, differs from what has been represented on most maps: it flows, in fact, in the general direction of south-west, and is not turned, as an incorrect reading of STRABO would infer, (RENNELL and D'ANVILLE) to the south-east.

Samosat having been fixed, it was then connected astronomically as well as by an itinerary, with *Orfa*, (*Calli-rhoe*, *Roha Orfah*, in its progress of corruption, *Edessa*, and *Antiochea* under successive masters.) To the north of the city are evidences in conic lines, and circles of elevations of pseudo volcanic action. The fish venerated so much in ancient times, are still preserved in the marble basins of the mosque of *Abrania*, and were recognized to be a kind of Barbel. From *Orfa*, the great Mesopotamian plain was crossed in the direction of *Harran*, "Carrhas clade crassi nobiles," and still more interesting as the residence of ABRAHAM. *Harran* was also connected with its rival in antiquity, *Serug*, of which scarcely a vestige remains. In the plain around the ruined site of the latter place, the party met two colossal lions, sculptured in basalt with refined taste (*Basanite* basalt, with disseminated augite); these may possibly be the remains of that vanity which prompted ANTONIUS CARACALLA to assert that a lion had fought by his side in his Parthian wars.

Doctor HELFER having been separated from the rest of the party when proceeding towards the Taurus, a journey made by him to the Salt Lake south-east of *Aleppo*, led to the discovery of an ancient city near a basaltic range, four hours S. E. of the Lake. There are some remains of a temple and several Greek inscriptions which have been furnished, with a detailed description of this hitherto unknown place, by Mr. HELFER.

Early in February an opportune reinforcement arrived, consisting of four sappers from England, and six seamen from the *Columbine*, which restored the Expedition to its original strength; and the pendulum, dipping needle, and other experiments being completed, the Expedition was put in motion on the 16th March. The *Euphrates* taking the lead to survey, and give the benefit of the rough charts, and a pilot to the *Tigris*, in order that she might follow at one or at most two moves, and thus spare fuel as much as possible.

Previous to the actual descent, the *Euphrates* passed up rather a bad rapid, and stemmed the strong current as far as the town of *Bir* in the most satisfactory manner, displaying the Sultan's standard, and saluting him with 21 guns, which were returned from the castle and by the acclamations of the astonished Moslems, who crowded both banks to be *really* certain that iron could be made to float, and to surmount the force of a current, now *overcome for the first time*, and God was blessed for such a creation, and sending men amongst them, ten of whom could take their town, was added.

Since the departure, 101 miles of the river have been carefully surveyed in the following manner. A boat was dispatched ahead usually for a distance of twenty or twenty-five miles, sounding, and taking bearings, which being placed on paper when the officer returned, he became pilot to the vessel for the distance examined ; and a second set of bearings, with a double set of soundings, were taken from the vessel's deck. Simultaneously with the water operations thus carried on by Lieutenant CLEAVELAND, Messrs. EDEN, CHARLEWOOD, FITZJAMES, and HECTOR, there were two other sets on land ; viz. a chain of grand trigonometrical angles along the principal heights, based on astronomical points, by Lieutenant MURPHY, R. E. ; and a smaller one, with a succession of short base lines from bend to bend, by Captain ESTCOURT, who is now laying down a map with his details of the ground, &c., and also embracing the labors of all his coadjutors : so that it is hoped, that the map of the important part of this great river will be sent home almost immediately*. A similar method of surveying is to be organized immediately on board the *Tigris*, so as to carry the work on to *Bussora* in the same manner, each vessel taking a separate section of the labor.

Our land parties, as well as the water, naturally involved much intercourse with Arabs, who have shewn themselves well disposed, except in one instance, when it became necessary to fire a 9-pounder blank to save a Sheik, their enemy, who was attacked whilst in our boat.

The state of the river is very favorable, although we run aground, owing to the deception caused for the moment by a bright meridian sun : but the deep part of the river was 420 yards wide at the spot in question, where we remained some days digging the vessel out, nor did she suffer in the slightest degree†.

XI.—*The Governor General's Conversazioné.*

On Tuesday, the 9th of November, was held the first of a series of entertainments, which we hail as the harbingers of a new era for Science and Research in India. Acting on the example of the DUKE OF SUSSEX, President of the Royal Society, Lord AUCKLAND, as Patron of the Asiatic Society, has expressed a desire to assemble around him at these periodical parties, in a social way, not only the members of the Society, but all residents and visitors at the metropolis, who are known to cultivate the fine arts, the sciences, or literature, and to collect on his tables for their inspection and amusement, in the language of our motto, 'whatever is performed by man or produced by nature.' Thus without interfering with the formal proceedings and records of the several scientific bodies, those who contribute thereto will have the satisfaction of knowing that their donations or their inventions will be likewise viewed by the head of the Government, and by a much more numerous assemblage than could ever be enticed to an ordinary meeting. Distant merit will feel that it is sure of appreciation, and ambition secure of notoriety. Schemes for scientific exploration—plans of national improvement—useful mechanical invention—promising talent in the fine arts,—will be brought forward, canvassed and encouraged, where encouragement is due, and the stimulus which has been wanting since the days of **Minto** and **Moira**, will again be restored.

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* Also the specimens already collected in the different scientific departments of geology, natural history, &c.

† The above report was addressed to the Bombay Government, previous, of course, to the disastrous hurricane which wrecked the Tigris, and destroyed so many lives.—ED.

We have hardly room to describe the conduct of the first meeting, nor do we think any formal report of a soirée, intended to be private, and sans formalité, would be becoming. It is more to satisfy our distant readers as to the nature of the parties, which they can so materially benefit, to speak paradoxically, *by their absence,* that we venture to insert the brief notice, which appeared in the daily papers.

"The south-west or drawing-room wing of the Government House was tastefully laid out with all the novelties in the arts, in antiquities and in natural history, that could readily be brought together. On the pier tables of the corridore leading to the rooms, were disposed very numerous specimens of the plants now in flower at the Botanical Garden, each ticketed with its classical name.

"On entering the ante-room, a very splendid collection of insects was seen displayed on the tables and against the walls, in convenient cabinets: the newest addition to these, (which comprised a portion of Dr. **Pearson**'s and of the Asiatic Society's cabinets) was the donation of Mr. **George Loch** of the Civil Service, to the Asiatic Society, at a recent meeting. A fine collection of shells just received from His Excellency the Governor of Ceylon, was distributed on the side tables of the principal saloon. In an adjoining apartment were selected fragments of the rich and highly curious Buddhist sculpture, discovered by Captain **Cunningham**, in the neighbourhood of the **Sa'rna'th** tumulus near Benares, and presented by him to the Asiatic Society. On another table the last fossil discovery by Dr. **Spilsbury**, the socket of the thigh-bone of an elephant from the rock at *Segouni,* whence Capt. **Sleeman** first brought to light the fossils of the Nerbudda valley. By its side were placed the femur of a modern and of a fossil elephant (the latter of an animal 15 feet in height) to shew that the present socket must, from its curvature, have belonged to a still more monstrous animal!

"On the round tables of the drawing room were spread out numerous beautiful drawings—of Mr. Hodgson's Nipal Zoology; of Dr. **Cantor**'s collection of Indian Snakes; of Dr. **McClelland**'s Assamese Zoology; and all the designs sent in to the Committee of the Metcalfe Library. In other convenient spots were displayed a wax magnified model of the human ear: stuffed objects of natural history, and models of Malay praws, presented by Capt. **Chads**, &c.

"After the company had severally made the round of these objects, their attention was drawn to the table which Professor **O'Shaughnessy** had prepared for the exhibition of his very ingenious model of the application of the late galvano-magnetic discoveries to the practical attainment of a working power.

"It would be impossible here to describe fully the construction of this curious wheel:—a number of horse-shoe magnets of soft iron, with wire coiled round them, were arranged on its spokes, so as to present their poles successively in rotation before the opposite poles of a more powerful magnet (also artificial) fixed on a stand at the side; the wires of the several wheel magnets were conducted in a manner not readily seen, so as to terminate in mercurial cups, into which were dipped the two wires of a small galvanic battery; on charging the latter, rotation ensued, and by a contrivance, as each revolving magnet arrived by the force of attraction, at the fixed magnet, its poles were instantaneously reversed so as to cause repulsion, while the next magnet above was attracted. We hope to see a full account of the Professor's successful adaptation when his apparatus is matured. The model worked steadily with 10 oz. power.

"The converse of the problem, or the development of a galvanic force from the ordinary magnet, was then exhibited on an adjoining table by a beautiful apparatus belonging to Mr. **James Prinsep**. Water was decomposed by the magnet; a candle was lighted by it; and an electric shock was administered to many of the spectators, among whom the native gentlemen in particular betrayed considerable astonishment at its effects.

"At the close of the evening refreshments were partaken of in the marble hall, and the guests retired at half-past eleven, apparently much pleased with the novel entertainment prepared for them by their illustrious host."

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of October, 1836.

Day of the Month.	Observations at 10 A. M.							Calculated Humidity.			Observations at 4 P. M.							Calculated Humidity.			Register Thermometer Extremes.		Rain.	Wind.		Weather.	
	New Stand. Barometer red. to 32°.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew point.	Hair Hygrometer.	Centesimal tens. of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.	New Standard Barometer.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew-point.	Hair Hygrometer.	Centesimal tension of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.	Cold on roof.	Heat in sun.		10 A. M.	4 P. M.	Morning.	Evening.
1	29,680	29,715	82,9	5,3	5,6	75,0	85	77	71	68	29,587	29,640	87,5	9,9	10,0	71,2	79	61	60	57	73,1	112,2		S.W.	S SW.	fine.	fine.
2	,746	,784	83,3	8,5	9,1	67,0	78	64	59	56	,659	,712	85,6	12,1	10,5	67,0	75	52	55	51	72,2	109,5		N.E.	N.	clear.	clear.
3	,737	,782	83,7	8,8	8,3	67,6	80	62	60	59	,632	,708	88,9	16,7	16,6	62,0	70	38	42	44	70,2	110,5		s. w.	S. W.	do	do
4	,771	,820	84,6	10,6	10,5	66,0	77	65	55	54	,669	,744	89,5	16,0	16,0	60,0	68	32	38	41	70,5	112,2		sw.	S. W.	do	do
5	,793	,844	84,3	11,7	11,0	65,8	78	52	55	56	,686	,755	88,6	14,4	14,0	61,8	74	45	42	50	71,0	103,2		S.W.	S. W.	do	do
6	,821	,870	85,0	9,3	9,3	69,0	78	62	60	56	,724	,790	88,2	12,4	11,1	68,8	77	52	54	54	70,0	112,8		nw.	nw.	do	cumuli.
7	,862	,916	84,5	9,7	8,8	68,0	78	60	59	56	,724	,793	88,3	11,9	10,6	69,5	76	54	55	52	68,2	111,6		nw.	nw.	do	clear.
8	,808	,862	82,4	6,4	8,2	71,5	81	72	70	61	,673	,740	89,0	11,7	9,3	71,0	77	55	57	54	70,3	102,8		nw.	nw.	cumuli.	cum. fine.
9	,824	,870	85,4	8,4	8,5	72,0	80	65	64	59	,714	,778	87,8	10,8	9,7	70,8	77	57	58	54	72,4	107,5		o.	nw.	hazy.	do
10	,856	,883	84,8	7,7	8,3	71,8		67	66		,713	,770	90,3	10,9	11,1	73,0	78	59	59	56	72,5	105,7	0,03	n.	n.	cir. stratus.	clear.
11	,862	,899	85,3	5,5	5,7	74,0	86	77	70	70	,754	,810	85,4	4,8	4,4	75,5	87	80	73	72	72,2	101,0	0,15	ne.	nne.	cum. fine.	overcast.
12	,848	,902	84,9	4,7	5,4	73,6	85	80	70	68	,725	,843	89,0	11,5	10,7	71,0	77	54	56	54	72,0	113,0		n	ne.	cir. stratus.	cumuli.
13	,859	,916	85,9	8,4	8,1	72,8	80	65	66	59	,756	,838	90,8	14,6	14,7	62,3	70	47	40	44	71,2	113,2		nw.	nw.	clear.	fine.
14	,881	,936	85,1	9,7	10,0	69,0	77	60	60	54	,779	,848	89,2	17,0	16,8	62,0	68	37	42	41	70,0	107,4		W.	nw.	do	clear.
15	,897	,932	61,5	13,2	14,0	59,2	72	45	50	46	,785	,837	86,5	18,9	18,8	53,1	60	30	34	31	67,0	101,8		N.	n.	do	do
16	,878	,907	78,5	13,1	13,6	54,6	70	42	46	44	,758	,808	85,4	19,1	19,2	50,2	58	27	32	29	59,8	103,2		nw.	nw.	do	do
17	,910	,935	77,3	9,9	10,8	58,0	77	55	53	54	,780	,836	84,5	15,2	14,6	56,2	68	40	40	41	59,5	112,2		nw.	nw.	do	do
18	,924	,960	80,1	10,3	10,5	61,5	76	55	35	52											61,3	106,8		ne.		do	do
19	,939	,972	77,7	7,6	8,0	64,2	80	52	65	59	,818	,874	84.5	14,5	13,1	57,5	70	42	42	44	61.9	112,0		nw.	n.	do	do
20	,951	,986	79,0	8,9	8,5	64,1	78	60	62	56	,840	,900	85,6	16,2	16,0	59,0	69	37	43	42	63.2	109,4		nw.	n.	do	do
21	,971	,002	80,4	10,6	10,6	60,7	77	55	52	54	,845	,912	84,7	15,5	14,2		71	38		45	61,2	109,2		nw.	n.	do	do
22	,993	,025	79,8	8,4	8,7	65,5	78	60	63	56	,852	,907	84,1	15,1	14,3	57,0	68	40	42	41	61,4	112,1		o.	n.	do	do
23	,936	,978	80,0	10,6	10,5	61,5	77	53	55	54	,801	,864	84,4	14,8	14,0		69	40		42	61,8	116,0		W.	N.	do	do
24	,916	,947	80,1	9,7	10,1	62,8	77	57	57	54	,788	,852	84,3	14,9	13,6	59,2	70	40	44	44	61,8	111,0		o.	o.	do	do
25	,939	,985	80,3	11,6	12,0	59,0	72	50	50	46	,823	,888	85,0	15,6	14,2		68	40		41	63,0	115,5		nw.	o.	do	do
26	,924	,969	79,9	12,6	12.8		72	46		46	,793	,854	84,1	16,8	15,2	57,0	68	34	42	41	58,7	111,0		o.	nw.	do	do
27	,905	,952	79,0	9,4	9,6	65,0	78	57	64	56	,788	,849	84,7	15,7	15,3	57,2	71	37	41	45	68,0	107,0		nw.	nw.	do	do
28	,882	,926	80,4	8,0	8,0	65,2	70	65	61	44	,773	,834	84,7	12,8	12,6		75	49		51	52,5	105,0		nw.	nw.	cirri.	do
29	,883	,927	78,8	8,1	7,6	64,5	67	63	63	40	,758	,818	84.2	11,9	12,0	57,3	76	52	40	52	64,2	103,2		nw.	nw.	hazy change.	fine.
30	,886	,928	79,9	8,3	8,6	65,0	78	62	62	56	,780	,836	84,2	11,8	11,0		77	32		54	66,0	106,8		n.	nw.	cir. cumuli.	cloudy.
31	,891	,936	81,2	8,2	8,3	65,2	81	64	60	61	,782	,826	80,9	5,3	5,0	69,8	88	75	70	74	69,2	101,1		ne.	sw.	cloudy.	showery.
Mean,	29,870	29,911	81,8	9,1	9,3	66,0	77	60	60	55	29,732	29,813	86,3	13,6	12,9	63,1	72	46	48	48	66,4	108,6	0,18	light northerly		steady clear dry weather.	

New Barometer at 10 P. M. 0.039 and at 4 P. M. .063 lower than old standard. The columns of the hair hygrometer are this month entered from a new instrument, the old one being otherwise engaged.—This may cause trifling errors; as its scale has not yet been accurately verified.

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JOURNAL

OF

THE ASIATIC SOCIETY.

No. 59.—November, 1836.

I.—*Notice of the* VALLABHI' *dynasty of Saurashtra; extracted from the Buddhist records of the Chinese. By* M. EUGENE JACQUET, *Member of the As. Soc. of Paris.*

A new source of information on the darkest period of Indian history cannot but be most acceptable to all who have perplexed themselves in attempting to reconcile and connect the scattered and contradictory traditions of the Rajpút bards with the inscriptions found in various parts of western India; and to assign specific dates even to sovereigns whose names are most familiar and notorious. While Mr. TURNOUR is throwing light upon the earlier periods of Buddhist rule, from the authentic chronicles preserved among the Ceylonese priesthood, it has been reserved for a distinguished orientalist at Paris to render us an equally eminent service from an opposite and more remote quarter of the globe! M. KLAPROTH's tables of Buddhist chronology, translated from the Chinese and Japanese authorities, had proved the intimate connection that existed between *India, Tibet,* and *China* for the first eight centuries of our era, and had encouraged the hope of gleaning a few cursory notices of the state of the Buddhist portion of the continent of India from the annals of some of their common patriarchs, whose head-quarters were variously located in *Magadha, Capila-vastu, Cabul,* and *Ferghana,* during that long period. More than this is, however, likely to be realized:—the narrations of Chinese pilgrims and travellers have been happily preserved, and, more happily still, have found their way to *Paris,* where alone, perhaps, exists the concurrence of talent and research capable of turning these valuable records to their best purpose. The specimen we have now the satisfaction of introducing to our readers has been elicited, the author writes us, by a perusal of Mr. WATHEN's translation of the *Gujerát* inscriptions in our last volume,—a translation which M. JACQUET does not hesitate to pronounce "ce que l' on a encore publié de mieux en ce genre dans l' Inde à l' exception peut-être de quelques monuments traduits par votre admirable COLEBROOKE."

We cannot deny ourselves the pleasure of adding his further testimony to the great utility of this important document. "J 'ai été d'autant plus satisfait de voir ce *Shásana* si heureusement interpreté, que je posséde, dans le petit nombre des copies d' inscriptions rassemblées par TOD, un *Shásana* non daté, ecrit dans le même caractére; et que j'ávais dechiffré de maniére à obtenir un alphabet absolument conforme à celui de Mr. WATHEN. C'est encore cet alphabet qui m' a donné le moyen de dechiffrer les legendes des anciennes medailles indiennes, et de reconnâitre le nom alteré de *Chandragupta* dans l'inscription de *Bhilsa,* publiée dans votre journal d'apres le facsimile de Mr. HODGSON."—In fact, M. JACQUET at *Paris* has been pursuing step by step the path we have been following in India; and while this fortunate key has opened to him an insight into the *Bhilsa inscription,* the self-same has led Capt. CUNNINGHAM to discover the titles *Maharája adhi rája,* &c. in the inscription from the *Khandgiri* rock, published in STIRLING's account of *Cuttack.* The copies are both too imperfect to hope for further success until the originals can be re-examined, and this has been undertaken by two friends upon whose zeal we may entirely confide,—Mr. L. WILKINSON of *Bhopal,* and Lieut. KITTOE, whose regiment has just marched to *Cuttack.*

But to return. In addition to inscriptions and coins, we may now look to the geographers and historians of *China,* for an insight into the middle ages of Indian history; and the latter have this great advantage over the former,—that they have scrupulously preserved dates in their records, and that they, as M. JACQUET justly says, "font le journal de l'Asie depuis le second siécle avant notre ère." In his very interesting article inserted in the *Journal Asiatique* on the recent Bactrian and Indo-Scythic discoveries, we are promised further and more copious extracts from the Chinese relatively to *Cabul* and the adjacent countries.—"Les témoignages des auteurs orientaux, et en particulier des historiens chinois, sur les monnaies des différents peuples qui ont successivement occupé les contrées de l'Asie centrale; les temoignages des mêmes auteurs, sur les langues et les écritures de ces peuples;"—these are included among the objects embraced by the learned author in his intended publication, '*Corpus Inscriptionum Indicarum,*' the appearance of which, our readers will regret to hear, is unavoidably delayed beyond the period at first indicated. It

is only to be hoped that the health of the single individual upon whom this mighty labor has devolved by the lamented death of M. KLAPROTH, will not succumb under so vast and important an undertaking.

We trust no apology is necessary for insertion of M. JACQUET's note in its original language.

ED.

" Je trouve les renseignements suivants sur la contrée de *Vallabhí* et sur l'origine des rois de cette contrée dans la relation d'un religieux Bouddhiste chinois qui visita la Transoxiane, la Bactriane et l' Inde dans les années 632 et suivantes de notre ère.

" ' La contrée de *Fa la pi,* aussi nommée contrée septentrionale de *Lolo,* a plus de six mille *li* de tour. La ville capitale de la contrée a plus de trente *li* d'enceinte. Les productions du sol, les conditions de la temperature, les mœurs, et le naturel des habitants sont les mêmes que dans la contrée de *Ma la pho.* Le nombre des habitants est considerable ; les familles sont opulentes ; on y compte en effet plus de cent maisons qui ont cent *laksha* de fortune ; d' immenses tresors viennent des pays les plus lointains s' accumuler dans ce royaume. On y trouve plus de cent *kialan* (monastères bouddhiques ;) les religieux y sont au nombre de plus de six mille ; ils etudient pour la plupart la section des écritures nommée *la parfaite mesure* qui appartient au petit *yána.* Il y a quelques centaines de temples consacrés aus *dévas ;* les heritiques y sont en grand nombre. Buddha, du temps qu'il etait dans le monde des hommes, a plusieurs fois visité cette contrée ; aussi le roi *Wou-yeon* a-t-il elevé des *sthoupa* aupres de tous les arbres sous lesquels Bouddha s'etait reposé, pour les faire reconnaître. La dynastie actuelle est de la race des *cha ti li ;* l'ancien roi etait neveu de *Che lo 'o ti to,* roi de la contrée de *Ma lapho ;* celui qui gouverne presentement est gendre de *Che lo 'oti to* roi de la contrée de *Kie no kieou tche ;* il se nomme *Thou lou pho po tcha...*"

" Le religieux Chinois ajoute qui c' etait un prince très genereux, très sage &c. car il avait une grande veneration pour les *trois joyaux* (Bouddha, la loi, et l'assemblée.)

" *Fa la pi* transcrit *Vallabhí ;* et *Lolo* लाट *Láṭa* ou *Lára,* la *Larique* des anciens ; *Malapho* est pour *Málava,* et *Cha ta li* pour *Kchatriya ; Chelo ó ti to* est la forme Chinoise de *Shiláditya ; Kie no kieou-tche* celle de *Kanyákoubdja* ou *Kanoudj :* et *Thou lou pho potcha* répresente regulièrement *Dhrouvabhaṭṭa.* Quant au roi *Wou yeon,* c'est à dire *sans chagrin,* c'est *Ashóka* deguisé sous une traduction Chinoise.

" Je dois d' abord observer que nous avons ici un roi de *Malava* et un roi de *Kányakoubdja* tous deus nommés *Shiladitya ;* (et ils paraissent distincts des roïx de *Vallabhí* qui ont portè ce nom) qui ne sont pas cités dans les tables genealogiques des rois de l'Inde recueillies jusqu' à ce jour. La relation ne fournit ancun renseignement sur *Shiladitya* roi de *Kanoudj ;* mais on lit dans un autre endroit que *Shiladitya* roi de *Mâlava* regnait soixante ans avant l'arrivée de notre religieux dans l'Inde. *Dhrouvabhaṭṭa* est certainement le même nom que *Dhrouvaséna ; bhaṭṭa,* et *séna* etant des titres de *Kchatriya,* de même valeur et presque synonymes, qui s'employent indifferemment l'un pour l'autre, sans que l'identité du nom propre auquel ils s'ajoutent en puisse étre compromise. La liste genealogique des rois de *Vallabhí,* extraite par M. WATHEN des inscriptions qu' il a si heureusement interpretées, nous fait connaitre deux *Dhrouvaséna,* dont l'un est le quatrieme et l'autre le onzième prince de la dynastie des *Bhâtârka.* Il n'est pas probable que le *Dhrouvabhaṭṭa* de la relation Chinoise soit *Dhrouvaséna I :* l'inscription que noux connaissons eût sans doute fait mention de l'honneur qu'avait eu ce prince d' étre allié à la famille royale de *Kanoudj ;* un etat qui n'avait été elevé au rang de royaume que sons le frére et le predecesseur de ce prince, n'êut pû d'ailleurs étre parvenue si rapidement à la haute prosperité et à l'etat de puissance ou le trouva le voyageur Chinois. Ce qu'il rapporte de *Dhrouvabhaṭṭa* s'applique donc à *Dhrouvaséna II,* et l'un des points chronologiques les plus importants de l'histoire de l'Inde occidentale peut être determiné avec assez de precision par cette identification de deux noms dont un est daté. L'inscription publiée par Mr. WATHEN, et redigée par l'ordre du septième prince de la dynastie, peut donc étre approximativement rapportée à l'année 550 de notre ère : cette date s'acorde mieux avec les données paléographiques que celle de 328, deduite très ingenieusement d'ailleurs par l'auteur, des traditions singulièrement suspectes des *Djaïna.*

II.—*An account of some of the Petty States lying north of the Tenasserim Provinces ; drawn up from the Journals and Reports of* D. RICHARDSON, *Esq., Surgeon to the Commissioner of the Tenasserim Provinces. By* E. A. BLUNDELL, *Esq., Commissioner.*

[Continued from page 625.]

DR. RICHARDSON'S SECOND VISIT, 1834.

The object of the second visit was to ascertain the truth of the rumours that had reached *Maulamyne,* of some dissatisfaction existing among the Shan traders on account of the bad market they had experienced latterly for their cattle, compared with former years, and to

obviate any bad feeling that might have arisen in consequence. None had visited *Maulamyne* that season, and it was said they declined bringing their cattle down any more. It was important that measures should be adopted to ensure the continuance of our supplies from that country, and Dr. R. was directed to extend his visit on this occasion to *Zimmay*.

He started on the 6th March, 1834, and travelling nearly the same route as that by which he had returned from his first visit, he reached *Labong* on the 1st April, having, when near that place, encountered the same petty delays as before, on the ground of preparing for his reception, and ascertaining from the astrologers a lucky day for his arrival.

"On the 1st of April started in the morning for *Labong*; and though the THOOGYEE of *Passony*[92] was with me at starting, neither he nor any of the neighbouring head-men accompanied me. One man ran before to shew me the road. Reached *Labong* about noon, and on arriving at the temporary houses or *tays*[93], for which I had waited three days, found only three small ones for the people, which might have been put up in three hours. No house for myself, and no one there to receive me. This was all so unlike my reception on my last visit, that I sent the interpreter to CHOW-HOUA to say, if they did not wish to see me, I was ready to return. He assumed anger and surprise that I had arrived without his being made aware of it; said he had ordered the head people of the villages to accompany me, and when half way to run out and let him know, when he would be at the *tays* in time to receive me. The same reason was given for not building me a house, as on my last visit; viz. that as I had a tent, they did not think I would occupy it; but he immediately called the people who had put up the sheds, and gave them orders to set about a house, which they commenced at once.

"The CHOW-HOUA sent some officers to wait on me, with a request to know when I wished to see CHOW-TCHE-WEET. I expressed a wish to see him to-morrow, as the approach of the rains would necessarily make my stay shorter than I wished. I hear loud complaints on all sides of the rascality of the Bengalees who have come up lately from *Maulamyne* to purchase cattle, and the people who last visited *Maulamyne* are very inveterate against the contractor (SHEK ABDULLAH) for supplying cattle to the troops, and declare their determination never to return so long as he continues to be the "*Gomanie*,"—as the first bullocks were taken by the Commissariat on the Company's account; and he being now the only purchaser, they believe him to be the Company, (*Gomanie*).

"On the morning of the 5th, the officers of the court, and some people with silver calats (salvers) for the presents and Mr. BLUNDELL's letter, came to conduct me to the TSO-BOAS[94]. They preceded me, followed by the people who accompanied me, about 40 in number, dressed in their gayest putsos, thirteen of them each carrying a musket. On arrival at my former place of audience, I found no sheds erected, and that I was to be received in the house (query, palace?) of the chief. I dismounted at the gate *Chow Rajaboot*; the KEINTOUNG

Tso-boa and others came out half way to meet me, (the whole distance about sixty paces,) and preceded by the letter, (the presents having stopped at the gate,) they led me to a seat on the chief's right. I bowed before taking my seat, and wearing my boots was never objected to. He was seated on a gilded pedestal (*yozaboleen*[95]) about two and a half or three feet high, and before him the chiefs of his principality on carpets spread on the mats with large triangular pillows to lean against, ornamented with gold embroidery. As soon as we were seated, the presents were brought in and placed before him. He put the usual questions respecting the King of England, the Governor General, &c. &c., the length of my journey, and the difficulties of the road; made some excuse for not meeting me on the road; mentioned the death of his son and nephew with much feeling; and expressed good-will and friendship towards us. Indeed, nothing could be more friendly or fatherly than my reception altogether, and certainly with every appearance of sincerity. It was evident at a glance his illness was no formal excuse for not seeing me; he was much emaciated, and evidently very weak. I was seated nearly opposite to the door of the private apartment, which was crowded with women and children, who sent me out a present of fruit. There was no dancing as on my former visit, but a male and two female singers seated immediately within the door of the private apartment, sung a sort of metrical history of the exploits of the Tso-boa and his six brothers, in which the successful insurrection of Kawkela, the eldest brother, against the Burmese sixty years ago, and the carrying off the people from *Kewt-them*[96], *Keintoung*[97], and *Mein-Neaung*[98], by the present chief, held the most conspicuous place; and though many of the unfortunate sufferers were present, any consideration for their feelings seemed never to enter the old man's mind: yet the expression of his countenance and manners altogether is benevolent; which character he bears among the people. The voices of the performers, both in sweetness and compass were, beyond comparison, superior to any thing I have heard out of Europe. After sitting about three-quarters of an hour, he retired on plea of weakness; his feet were swelled, and he tottered a good deal before reaching the door of the inner apartment. After spending some time in conversation with the chiefs I took my leave, intimating my intention of calling in the morning on Chow-Houa, by whom all business is now transacted.

The chief's house is situated near the middle of the town in a large stockade inclosure, and surrounded by a garden. The wooden hall in which I was received is about sixty feet long by thirty wide, and ornamented with three small China chandeliers, some paltry Chinese and India looking-glasses and China lanterns, some of glass and some of paper; a picture of the great pagoda of *Rangoon*; one of a Chinese joss, and a portrait much resembling one of our Royal Family. The most valuable ornaments were the muskets I took up in my last visit, which, with some Chinese-looking scimitars and swords with long silver handles, completed the decorations. The white umbrella was not unfurled; the floor in front of the *yozabollen* or throne was covered by the carpets and triangular pillows of the chiefs, who assume a much more manly position than in the presence of some of the lowest chiefs of *Bankok*; though I am told that next to the Rája of *Ligore*, this is the highest Chief in the kingdom. On the 6th, according to my notice of yesterday, called on Chow-Houa, and had a long conversation on the duties being taken off their elephant-hunters in our provinces. He readily agreed to the free sale of buffaloes, paying an export duty of half a tical of coarse silver, and reducing that on bullocks to the old rate of one quarter. I brought to his notice the complaints of the Bengalee cattle-dealers, of the refusal of the court-officers to interfere in their complaints against each other, and called his attention to the 10th paragraph of Colonel Burney's treaty of *Bankok* in 1826 on the subject. He complained of the total want of principle in these people, with one or two exceptions, (which all I have heard from themselves tends to confirm;) said he was glad the subject had been mentioned; as, though they had copies of the treaty, they were afraid to punish our people, and had, besides, another difficulty to contend with, in the offenders escaping from one territory to another; and that though they had the power, there was an indelicacy felt in apprehending them in the *Zimmay* district. They had now my opinion that they should act according to the treaty, and would do so in future, and hoped there would be no further cause of complaint. He said he had no objections to the *Zimmay* officers following offenders into this district, and that they would do the same from this; but begged me to impress the necessity of it on the *Zimmay* chief on my visit there, to prevent misunderstanding between relations; as Chow-tche-Weet is now a very old man. I found by this, that the visit I had intimated I intended to make to *Zimmay* was taken as a settled matter, though they had strenuously opposed it on my asking to do so in my last visit.

"On the 10th I received an invitation, or rather a request, from Chow-tche-Weet to attend his son's funeral. He begged I would come early, and see the whole ceremony. I accordingly went at 11 o'clock, and remained till 2. On my arrival, a Pounghee was seated in the centre of the shed reciting, in a monotonous sort of chaunt, a blessing on all present. He ceased soon after my arrival, and a daughter of Chow Raja Woong of *Lagon*, a very pretty girl of 18 or 20 years of age, played for some time on the *ke wine*, (brazen circle,) an instrument composed of small graduated gongs hung horizontally in a circle, in the centre of which the musician sits and beats with small sticks. She played evidently as a proficient. This was followed by a boxing-match, in which the boys, when once come to blows, hammered away at each other's faces much like two little English fellows of the same age. There was a good deal of shuffling before the first blow was struck. They were followed by two men who flourished their arms about within a few inches of each other's faces under a most overpowering sun, for half an hour, without, however, hurting each other much, though they were exceeding serious and intent. Chow Raja Boot then, dressed in a white robe, ascended a small platform about seven feet from the ground, and showered, or rather pelted, a largess amongst the people. On the platform was an artificial bamboo-tree, with perhaps two hundred limes, in each of which was a small Siamese coin of two or three annas hanging from the branches, which he pulled off, and with them pelted the people below;—though there was, of course, great struggling for the limes, there was little noise, and not the least quarrelling. Chow-Houa's wife then begged I would allow the Burmese to exhibit their dance, and as there were two professed dancers of the party and one or two musicians anxious to acquire merit by assisting in the amusement, she was gratified; after which they commenced to drag out the car with coffin. It was burned with rockets in the same manner as a Pounghee, outside the town, about 4 o'clock; most of the wives of the headmen were present, and the whole of the ceremonies were gone through without quarrel and in great good humour. The deceased was the same whose house was burnt during my last visit here, and who sent out to beg me to look through a small sextant I had been seen using, and tell him who had stolen a ring he lost on the occasion. I left the shed when the coffin was moved, and prepared to start for *Zimmay* in the morning, congratulating myself in getting off a day sooner than I had anticipated; but about 9 o'clock, BENYA TCHE came out to say CHOW-TCHE-WEET begged me to remain one day, as he was anxious to see me to-morrow before starting for *Zimmay*. After many complaints of loss of time and fear of the rains, I was obliged to consent to remain; and on the morning of the 11th, an officer came out to the encampment to say CHOW-TCHE-WEET wished to see me. I promised to wait on him immediately after breakfast. On arriving at the house found a large assembly, and the only communication the old man had to make, was a request to remain till after the new year*, a further loss of three days. I at first refused, but on his urging his request, and reflecting that nothing would be done at either place during the festival, I agreed to remain on condition I was not detained here on my return. The TSO-BOA made some demur, as in duty bound, as a good Buddhist, about the sale of the cattle; he was, however, easily satisfied by transferring the sin to the sellers and CHOW-HOUA, who sanctioned it. He was as kind as usual, always addressing me as his "*luck Chow Engrit*," literally, "son chief English." He talked of a reference to *Bankok*, which I said was unnecessary after the treaty of 1826, and he was again satisfied. He is quite in his dotage, and repeated the same things over and over: the people from their respect for him shew him, however, much consideration. He asked if there was any difference in the value of his presents and those to the *Zimmay* chief, and seemed pleased when told that his were the most valuable.

"After breakfast, on the 13th, two officers, dressed in white robes used in religious ceremonies, came out to my tent by the CHOW'S orders, to conduct me where the ceremony on his grandson entering the priesthood was to be performed. I found a large assembly of people in an old *zayat*[99] near the pagoda. The CHOW was seated on a mat near the centre of the place,—the other chiefs near him, his wives behind him—all dressed in white. I found a carpet and pillow for me close to CHOW RAJA BOOT. A Pounghee was seated in the middle expounding the law, and CHOW-TCHE-WEET had told him to continue till my arrival, as he wished me to see the whole ceremony. As I was told I would be expected to contribute, I sent the interpreter to the CHOW with 10 rupees; and he soon afterwards went out to the open space before the *zayat* to inaugurate the boy (about 7 years of age) in his holy office. The ceremony is the same as in Burmah and other Buddhist countries, shaving the head, bathing, investing with the yellow garment. Whilst he was gone, his son told me a Rahan was also to be raised to the office of high priest, *(See-dan)*[100]; that the CHOW before investing him with his office asks him if he will obey his lawful orders; which being answered in the affirmative, he makes over to him all authority over all ranks of the priesthood. The high-priest then asks the Tso-boa if he will listen to his intercession in favor of criminals condemned to death when it shall appear to him that the punishment is too severe for the offence; to which he assents. On the return of the Tso-boa to the *zayat* he called my interpreter and told him in a whisper the money I had given was too little for distribution, and desired him to ask me for 13 rupees more; which I immediately sent. In the meantime, an old priest invoked a blessing on all present by name, amongst which I discovered my own; and the *Sea-dan* who has been raised by the votes of the priests for his strict observance of the precepts of Budh, promulgated rules and ordinances for their guidance much stricter than those which have been known here for some years, where the discipline has been exceeding lax. Sent the interpreter to inquire how the Chow-Houa, who had been ill, was, and to request Benya Patoon[101] to call on me. The former no better; the latter promised to call in the morning. Benya Patoon called on me this morning; he is about 50 years of age, and an exceedingly intelligent person, His father came originally from *Pegu* to *Zimmay* with about 3000 other Taliens on the destruction of that city by Alompra, A. D. 1757. A short time after their arrival here, an army of Burmans encamped to the northward with the intention of attacking *Zimmay*. The Taliens were promised this,—if they beat off the enemies, they should henceforth live free of taxes. They attacked them, and were successful, and for a time were well treated; but in three or four years, when gratitude began to cool, they were taxed without mercy; and on any expression of discontent, numbers were executed under pretence of secret conspiracy. The Taliens in fear and disgust removed farther northward to *Keintheu* under the Burmese;—the Benya and some other young men went afterwards to *Ava*, from whence he was sent to *Keintheu* on a royal message, and with twenty-five others was caught by a slave-catching party, and from this place sent to *Bankok*, where he soon came into favor with the king, who raised him to his present rank, and sent him up here to look after the Siamese interest at all the three towns. He gives a shocking account of the brutal rapine, and destructive waste of human life in the petty border-warfare and slave-catching incursions all along the frontiers, that has kept down population, laid entirely waste many large towns, and retarded civilization and all the arts of peaceful life in this unhappy country to a degree that could not be exceeded, I should hope, in the annals of any portion of Africa. All of this has been almost entirely put a stop to by our occupation of the provinces on the coast. He gives a somewhat different version of the Cochin-Chinese war from any I have heard. He said the Cochin-Chinese endeavoured to save the town of *Wentian*[102], *Chandapoora* or *Lingen*, when the Siamese attacked it seven years ago. The Siamese would not attend to negotiations on the destruction of the city when horrid cruelty appeared to have been perpetrated. One of the sons of the king found his way to *Hue*. The King of Cochin-China[103] sent an ambassador to *Siam* to say the prince had found his way to him; but as he wished to avoid a war, under certain conditions he would give him up. The Siamese treacherously murdered his ambassador, saying he had given protection and encouragement to rebels. The Cochin-Chinese, enraged at this piece of perfidy, had commenced the war. The latest accounts said the Siamese had the best of it, and were east of the Cambodia river.

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* I afterwards learnt that the reason of his requesting me to stop was a fear lest I should be insulted, or the people get into any quarrel with the *Zimmay* people, during the holidays at this joyous season.

"Left *Laboung* this morning (15th), at 6 A. M., and in five hours and a half reached *Zimmay* about N. 30° West of the former place. The Mein Neaung Tso-boa came to see us off, and brought with him a person sent as a guide, though many of the people with me were known to be acquainted with the road. He took us through the fields, a path he evidently did not know himself, under pretence of breakfast being prepared for the people at some village by the way, and I ultimately regained the road by the direction of some Talien people we met. The whole of the road lay through a rich and cultivated country, irrigated by a water-course from the *May-ping*, the main trunk of which is some seven or eight miles in length, and thirty or forty feet in width, by eight or nine in depth, as far as we travelled along the bank of it. At 8 A. M. came on the banks of the water-course, and at 10 crossed the *May-ping* at a ford of considerable breadth, but at this season only reaching to the poney's saddle. On the *Zimmay* side found some officers waiting to conduct me to the *zayat* or *tay*, which we found to be a rattle-trap of a wooden building, forty-five feet by twenty-five, surrounded by an eight feet verandah a foot lower, with four small rooms on each side, in which the people were housed. These buildings shut out every breath of air; which, as the thermometer was 103° at mid-day and 80 at 8 P. M. was any thing but comfortable. The floor was of split planks laid on without rails or fastening, and as the people crowded up to look at me, the rattling was unsupportable. As I would get no relief from this annoyance by complaint, I was ultimately obliged to drive them down by force; after which they did not venture further than the steps of the *zayat*. The *zayat*, which is about a quarter of a mile from the town, was surrounded by drunken holiday-making people, singing, and hallooing, and shouting till about 12 o'clock, one of whom came close to the *zayat* and abused us. My people pursued him to a neighbouring house, which I was just in time to prevent them breaking into, and I denounced the occupier to the police in the morning.

"On the 16th, the brother-in-law of the Chow-Houa and some other officers paid me a visit of ceremony, bringing a present of rice, sugar-cane, &c. with the gratulations of the Tso-boa at my arrival, and expressing his and their good-will towards the English. They remained about an hour. Before they left, I complained of the annoyance of the rabble, which they promised to remove. The forcible ejectment of the rabble yesterday left me at tolerable peace to-day till the evening, when the wife of the Ken-Toung Tso-boa came to visit me, and such a number of women came under her protection that the floor of one of the passages gave way with them, but fortunately no accident occurred. I hear nothing but complaints on all sides of the rascality of the cattle-merchants employed by the contractor to buy his cattle. They are old boat lascars, discharged peons, and thieves from the jail, to whom he has had the folly to entrust more money than they ever saw before. Considering themselves rich, they have bought wives and slaves, and dissipated part of the money; and as they cannot return to *Maulamyne*, they sell the property at what they can get for it. Some of them have picked up the Shan language, and act as interpreters to strangers arriving from the coast, get their property into their hands and appropriate the proceeds. The presents they are enabled to make at this (to them) cheap rate, and the knowledge of the language, sets them above the fear of punishment. On the morning of the 17th, in consequence of my complaint of yesterday, a person was sent out to keep the people from coming up in the *zayat*, and a writer came to hang up a notice to the same effect. I have been left to myself all day. The poor woman into whose house the person who abused me on the night of our arrival ran for shelter, came to-day to beg my intercession. She is a stranger from *Bankok*, and, as she could not point out the offender, is threatened with a fine. As they have shewn a disposition to punish the person, I promised to intercede for her.

At 10 A. M. on the 18th, Chow ne nam Maha Neut and some other officers came out to conduct me to the Tso-boa's house. They proposed that I should halt for some time at the court of justice, which was soon given up on my positive refusal to do so, and I proceeded in the same order as I had done at *Laboung*. The Tso-boa came in after a few minutes and seated himself on a cushion at the foot of the *zoyabollen;* I was seated immediately in front of him on a pretty large Persian carpet with pillows. I inquired after his health, age, prosperity, &c. and explained the purport of my visit to be a wish on our part to cultivate his friendship and open the gold and silver road, that, as at *Laboung*, we might exchange our superfluous produce to mutual advantage, &c. &c. He replied, that to all proper subjects of traffic there was no restriction. I said I was glad our customs agreed, and hoped that there would be now no further objections to the export of cattle and buffaloes, which was what we principally wanted from this country. The Chow-Houa, who as at *Laboung*, transacts all the business, and who is said to be the only one opposed to the trade in cattle, objected on the score of the great mortality which sometimes takes place among them, in which case I observed the price would rise, and still only surplus cattle would be sold; that I did not urge him to give the people an order to sell, but permission to do so. He made some objection, half expressed, on the score of fear of the *Nats* or presiding spirits of the country. I pointed out the fact of their being sold to the Red Careens, to which he made no reply; but, Buddhists as they are, the question of the life or death of the animal has never been mooted by any one except Chow-tche-Weet in transferring the sin of selling to the Chow-Houa. The Tso-boa then heard the letter read, ordered in some sweetmeats, desired us his children to continue our business, and retired on plea of weariness. The hall I was received in, is a brick building about 100 feet by 50; the walls painted with an extraordinary jumble of clouds, trees, temples, &c.; on the window-shutters natives of different countries in the act of salutation. Among others I observed two Europeans in the costume of the time of George II. Below the windows a sea with boats and the white umbrella (emblem of royalty) of seven tiers of coarse cotton cloth, diminishing in size to the top (like an old fashioned dumb-waiter,) was fixed above the *zoyabollen*. I did not ascertain what chiefs were present, but the Tso-boa and the Chow-Houa were the only ones with whom I had any conversation. The Tso-boa is 80 years of age, but looks much more hale and robust than Chow-tche-Weet. He was raised to the Tsoboaship by the king of *Bankok*, from his merit as a soldier, though he can neither read nor write,—a very unusual thing in this country.

"On my way to the fort this morning I called on Chow-Houa, and found him as much disposed to be friendly as he had been the reverse on the two former occasions. He agreed to the trade being perfectly free and unrestricted.

No duty will be levied on imports. The duties on cattle to be as at *Labong*:—elephants one tical; horses free of duty; muskets and slaves are alone prohibited being taken out of the country;—offenders from *Laboung* shall be given up, and the people of this district harbouring them punished. He said our presents of muskets was a certain mark of friendship, and that he intended to send fifty cattle to the Commissioner; and as I could not take them with me, he requested that I might arrange to leave some one to take charge of them.

"*24th.* I went to take leave of the Tso-boa, who received me nearly alone in an outer hall; gave me the letter for the Commissioner, and was most friendly in his professions. His house consists of three wooden ranges of about fifty feet wide, (their length I could not see,) the brick hall standing across the ends, in which I was formerly received, and the small one in which I saw him to-day. Soon after my return to the *taydau* or *zayat*, Chow Maha Neut came with a message from Chow-Houa to set my mind at ease regarding the cattle and trade generally; that every facility should be given to purchase cattle, and the trade should be perfectly free and unrestricted; that it was not becoming to be bounden by promises, but that we would see hereafter the strength of their friendship. He regretted that he had not seen me on my last visit, that my stay this time was so short, and requested I would return for a longer stay next fine weather, &c. &c. I left *Zimmay* at half past 4 p. m. on the 24th, and reached *Labong* at 10. The walls of the inner town of *Zimmay* are 800 fathoms from east by west and 1000 from north to south, all of brick, and a ditch and rampart all round. The outer wall, which reaches from the north-east to the south-west corner, is circular and upwards of 1800 fathoms, one-half of brick, the other of wood with a rampart round the brick part, and a ditch surrounding the whole. The ditches when in repair, (which they do not appear to be now,) can be filled from the river. The town is situated four or five miles from the eastern foot of the *Bya-tha-Dyk*[104] hill, the highest in the range, and between it and the hill is another small single-walled fort about the size of *Laboung*, called *Moung-Soondank*[105], (city of the flower garden.) All the houses in *Zimmay* above the poorest of the people are surrounded by compounds fenced in, in which are cocoanut, arica, betel, bamboo, and other useful trees, with a great variety of flowers and flowering shrubs, which are watered by a stream of clear water brought from the hill. The valley in which this town and *Laboung* both stand, is little less than one day from east to west, and little more than three from north to south. Much of the valley near the town is under cultivation, which is all prepared by irrigation, and the grain is transplanted, yielding upwards of one hundred-fold, though the fields are never left fallow."

Dr. R. quitted *Laboung* on the 29th. On the 9th May the rains set in, and continued almost without intermission during the remainder of his journey. He arrived at *Maulamyne* on the 21st May, suffering greatly from the exposure; most of his followers ill, (several of them died shortly after,) and the elephants completely knocked up by the difficulties of the road.

DR. RICHARDSON'S THIRD VISIT, 1835.

Dr. R. was directed on this occasion to extend his visits to some of the other Shan States, and also to the tribe of Red Kaffens[106] on the west bank of the *Salween*, who, sometime previous, had sent a message to *Maulamyne* to say they should be glad to see an European officer in their country, and to open an intercourse with us.

Dr. R. started on the 29th December, and arrived at *Laboung* on the 26th January, 1835. Here he found that his old friend the "CHOW-TCHE-WEET," or "Lord of Life," was dangerously ill. The old man received him, however. Dr. R. says—"On entering his house, I found the chiefs and elders assembled and a curtain across the room. After some conversation, chiefly regarding the war to the eastward and the great blessings conferred on this country by our occupation of the Provinces, the curtain was drawn aside, and showed us the poor old man evidently on his death-bed, with his children and grand-children around him. He spoke but little; said he was glad to see me again, and handled one of the muskets I had brought with me to present to him."

After staying a few days at *Laboung*, Dr. R. proceeded to *Zimmay*. Here he had some long discussions with the CHOW-HOUA of that place relative to some impediments and restrictions he had placed on the trade in cattle, and to some late attempts on the part of the frontier Shan petty chiefs to levy tribute on the Kayens residing on our side the boundary river. These matters were, however, amicably adjusted, and much kindness and attention were shown him. It was the period of an annual festival, for which he was urgently pressed to stay. He says—

"One of the amusements at this festival was the letting off of large rockets—each rocket being honored with some name, and supposed to appertain to some chief or great personage. One was appropriated to me; and my coolies and servants being joined by a number of *Maulamyne* traders then in the place, who entered into the spirit of the thing, my rocket was well attended to the ground with dancing and singing, to the delight of the Shans, to whom Burmese music and dancing was quite a novelty. The rockets were all of wretched construction, but it so happened that mine performed its duty in a style infinitely superior to any on the ground; and such is the superstition of these people, that I feel confident this incident has made an impression on their minds of the superiority of our nation which will not easily be effaced."

Here Dr. R. met a large portion of the annual caravan of Chinese traders, of whom he says—

"At *Zimmay* I found the caravan of Chinese traders, consisting of 200 mules and horses. Three hundred more were said to be at *Moungnan*, where cotton is abundant. They had arrived in the country a considerable time before me, and were preparing shortly to return home. I had a good deal of conversation with the two heads of the caravan, who seemed to be intelligent, enterprizing characters. They said they had long entertained the idea of visiting *Maulamyne*; and now that they were invited to do so, and were assured of protection, they would undoubtedly do so next season; the present one being too far advanced to allow of their increasing their distance from home. They requested that an interpreter should meet them at *Zimmay*;—and from their repeated requests that he should be at *Zimmay* in all November, in order to accompany them down, I feel convinced these people will be at *Maulamyne* before the end of the year. With the chiefs I found no difficulty whatever in obtaining their consent to their passing through the country: no objection was ever hinted, nor have I reason to expect that any will hereafter arise.

"The imports by these caravans consist of copper and iron vessels, silk, (raw and manufactured,) satins, gold and silver thread and lace, musk, walnuts, carpets, and vermilion. They export from the Shan country cotton, ivory, skins, horns, &c. &c. From the information which I could collect, the caravan assembled at *Moungkoo*, distant from *Zimmay* about two months' journey. Their goods are conveyed by mules, and they would appear to travel rapidly; as they asserted they would not be more than twelve days from *Zimmay* to *Maulamyne**. They allow nothing to detain them on their journeys. If a man fall sick, or is disabled, he is left behind; and if one dies, they do not even stop to bury him, but cover his body with a cloth and continue their route."

Dr. R. left *Zimmay* on the 23rd February for *Lagon*,[107] a town he had not hitherto visited. The following is his route:—

"23*rd*. Direction S. 65 E. Distance, 5½ miles.

"Started at 1 P. M. and reached *Paboung*[108] at 3. 30. This is a small village of only twenty-four houses, but the Thongyee, or head-man, has altogether about three hundred houses under his jurisdiction. The road was level, through paddy fields, intersected by small slips of jungle.

"24*th*. Direction S. 20 E. Distance, 16½ miles.

"Left *Paboung* at 7. 35. At 9 crossed the *May-quang*, which runs past *Laboung* and falls into the *Moypiny* to the southward. At 11. 40 we halted at the village of *Ma-wan-tchay*[109]. The road throughout the day was good and pleasant; considerable cultivation, and the inhabitants numerous. The people of the village where we have halted are all captives from *Mein Neaung*, who, never having seen an European, were very curious, but, at the same time, exceedingly civil and hospitable, having provided a dinner for my followers. An old man of the village remarked to me, after we had been encamped a few minutes only, that a Burman chief, travelling as I was doing, would ere this have tied up and flogged some of them to shew his authority, and that neither he nor his father had ever heard of a person travelling through a country merely to make friends. He wished I would open the road to his native place of *Mein Neaung*.

"25*th*. Direction S. 20 E. Distance, 13 miles.

"The road to-day was through a teak forest and over several small hills lying from a few yards to a mile distant from each other. Our guide to-day was a Doctor, who was quite an amateur in his profession, and spread out all his medicines under a tree and began prescribing gratis for our people. He had in his store of medicine the thigh-bone of a dog, the jaw of a monkey, the vertebræ of a fish, part of a grinder of an elephant, the fore-tooth of a rhinoceros, some bone of a turtle, and two or three pieces of broken china. The rest of his collection consisted of little bits of sticks, and roots of all colors, to the number of two hundred and eighty-one, (I had the curiosity to count them,) the names and virtues of all which he professed to show. Not the least curious part of the collection was his mortar or substitute for one; it was a turned wooden bowl ten inches in diameter, with a handle to it, and inside opposite the handle a piece of coarse flinty sandstone fixed with lac about four inches square, and sloping towards the bottom of the bowl: on this the various articles are ground down, in sometimes a quart of water if the patient is very ill.

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* A small party of them have since arrived at *Maulamyne* in company with the men sent to meet them. They made the march in 15 days and express themselves satisfied with the market here.

" *26th.* Direction S. 70 E. Distance, 16 miles.

" The road to-day was very tortuous and in some parts steep and rocky. No inhabitants or cultivation were to be seen.

" *27th.* Direction East. Distance, 15 miles.

" Started at 7 A. M. March lay along a good road in the jungle till 8. 30 when we passed a last year's clearing with buffaloes and other signs of inhabited country. At 8. 45. crossed the *Maytan*[110], a considerable stream in the rains, now not ancle-deep, and on the eastern bank at *Ban-hang-sat*[111], a village of some size;—found they had received orders to have breakfast ready for the people, which was fortunate, as there was not rice for half of them at starting. Here we halted fifty minutes under the tamarind trees, whence two hours marching brought us to *Boutue*,[112] on the banks of a stream of the same name about the size of the *Maytan.* The road has been good throughout and the country level. The people of this village have orders to supply us with every thing, and take us into the town to-morrow; they brought out dinner for the people soon after our arrival,—rice and vegetable stews, ready cooked, each house furnishing a portion, as is the custom in Burmah. These were brought out by the women of the village, young and old; the former, as usual, uncovered to the waist, and finer busts are not to be found in the world, and many of them fair as Europeans.

" *28th.* Direction S. 70 E. Distance, 4 miles.

" Reached *Lagon* at 8. 20 A. M. There are three towns close together, two on the north and one on the south side of the river *Moy-Wang*, [113] in the last of which most of the chiefs live. The river between the towns has a course nearly east and west, and, dividing, forms a little sandy island nearer the south side, on which sheds had been prepared for our reception. The whole breadth of the river is about one hundred and forty-seven paces, but at this season there are only two small streams near each bank about knee-deep. During the rains even, it is seldom full, and consequently for the greater part of the year is not navigable for boats of any size. Neither is it favorable for purposes of irrigation, and as the rains are often insufficient, it is a far less favorable site for a town than *Laboung* or *Zimmay*, though containing an equally numerous population. As the trees in the town and neighbourhood are luxuriant, and the soil generally appears productive, it is probably the fault of the people themselves that provisions are scarce."

The following are Extracts from Dr. R.'s Journal during his stay at *Lagon.*

"*3rd March.* Visited several of the chiefs to-day. They all expressed themselves most friendly to us, and spoke openly of a different feeling existing at *Zimmay.* As my visit was entirely conciliatory, I avoided the subject, merely saying, that we were grateful to our friends, and that I believed the general feeling of the people of *Zimmay* was friendly towards us, in which they agreed, and said they saw I was aware where the bad feeling lay. I spent several hours with the several chiefs, and altogether passed a very pleasant day, owing to their kind reception and the absence of all ceremony.

"*4th.* Went over to one of the towns on the north side of the river to visit a chief residing there. The whole of the town is enclosed within old walls, the river face of which is mud, the remainder brick, but in a very ricketty condition. The paths from one house to another, which are all far apart, are more like the paths in a common village than the streets of the town.

"*8th.* There are fewer elephants here than at *Zimmay.* The king of *Siam* called for a return of these animals last year, when three hundred were found here and near one thousand at *Zimmay,* large and small. I learn that there are no taxes on specific articles here. Every cultivator, without exception, at the close of the harvest, pays into the Government granary a quantity of grain equal to what he may have sown, and each house pays half a tical of coarse silver on account of sacrifices to the *Nats,* or protecting spirits of the country. These sacrifices are another name for public feasts as the buffaloes, pigs &c., together with the spirits that are provided, are consumed by the people. The land is the property of him who clears it, and any one may cultivate unoccupied land, provided he pays the accustomed contribution to the public granary. The person so clearing and cultivating land may dispose of it in any way he likes, and cannot be arbitrarily dispossessed of it by the chiefs, as in Burmah the people are glad to place themselves under the protection of some chief and become followers of his family. They work for him, and are often sent by him on trading excursions, receiving occasionally a portion of the profits.

"*10th.* Received a visit from No. 1 wife of the CHOW-HOUA, accompanied by her two daughters and several female attendants. She says she will be obliged to leave her daughters behind when she accompanies her husband to *Bankok,* (whither all the chiefs are bound, on the occasion of CHOW-TCHI-WEET's death,) as the king might take a fancy for one of them. This, she said, would be all very well for a year or two, after which she would be discarded and neglected, and then her life would be one of misery."

Dr. R. left *Lagon* on the 10th March, and arrived at *Laboung* on the 13th, a distance of 44 miles ; direction N. 70 W.

"Here I found the chiefs of all the associated States, assembled to perform the funeral rites over the body of CHOW-TCHE-WEET, the acknowledged head of their family. I had to enter into long and disagreeable discussions relative to the three elephants which had been stolen at *Maulamyne* on several occasions, and which had been traced to *Laboung* and the thieves discovered. The difficulty arose from the thieves being proteges or dependents of CHOW-HOUA of *Laboung,* who alone opposed restitution of the property, or the punishment of the thieves. I at last threatened, that unless I could report that this business was satisfactorily settled, it would be referred to *Bankok.* This alarmed them as, under present circumstances, they must deprecate any reference against them to the king of *Siam*, who might take advantage of the opportunity to place a stranger in the situation of the deceased chief. Still the settlement was put off till the arrival of the chief of *Zimmay*, who had returned to his town for a few days, and I was obliged to quit without knowing the result of their deliberation. I learnt, however, by a messenger who met me on my return from the Red Kayens, that the affair had been terminated to the satisfaction of the owners of the elephants, who had accompanied me from *Maulamyne*.

" At this assembly the chiefs seemed on very bad terms with each other, and their deliberations were conducted with much acrimony, and on one occasion with personal violence. The Chow-Houa of *Laboung* appeared to have given general dissatisfaction, though he again was full of complaints against the others. This mutual bad feeling was shewn in the inditing of the letter brought by me from the chiefs of *Laboung*. I was informed by one of them, that when it was read to Chow-Houa, he ordered his name to be struck out without assigning any reason. When I called on him to bid him farewell, I asked him why he had done this. He begged me to be assured that no disrespect was intended by it; that the letter had been written without, in the least, consulting him; and though it was a very good letter, yet he declined to have his name in it under such circumstances. He then went on to say, that the death of the old man, whose obsequies they were then celebrating would, he feared, be the cause of much evil and misery to the country, owing to their own dissensions.

" Having at last obtained the letter, and having been furnished with an order for guides from the frontier to the Red Kayen country, I left *Laboung* on the 25th March."

The route usually travelled from *Laboung* and *Zimmay* to the country of the Red Kayens on the west bank of the *Salween*, is through *Mein-loon-gyee*, towards which Dr. R. bent his course and arrived on the 31st March. Here he remained one day in order to procure rice and other articles for himself and followers during the remainder of the journey, as no villages would be fallen in with for some days.

" *April 2nd*. Direction N. 15 W. Distance 15 miles.

" The road lay generally along the banks of the *Mein-loon-gyee* river, crossing occasionally from one side to the other and through a magnificent teak-forest.

" *3rd*. Direction N. 39 W. Distance, 20 miles.

" The road much the same as yesterday's march. Crossed the river twelve times during the day with the water sometimes over the saddle flaps.

" *4th*. Direction N. 75 W. Distance, 17 miles.

" Left the *Mein-loon-gyee* to the eastward, and proceeded along a road of much more rugged character, up a small stream which we crossed seventy or eighty times. The hills are here more close and precipitous, but the tops of many of them are cleared for grain cultivation, the only sign of the country being inhabited. Met fifteen elephants returning from the country we are about to visit, with stick-lac.

" *5th*. Direction S. 80 W. Distance, 12 miles.

" Crossed the highest part of this range at 7 A. M. from whence the water runs westward into the *Salween* and eastward into the *Mein-loon-gyee.*[*] The road to-day has been the worst we have travelled ; the hills very trying to the elephants, and the stony banks of the streams to the horses' feet. Met two poor little children recently purchased from the Red Kayens ; one for six bullocks ; and the other, a very interesting child, about 7 years of age, for 10.

" *6th.* Direction W. Distance, 11 miles.

" First part of the road over a steep hill ; remainder over low land covered with grass, formerly cultivated.

" *7th.* Direction W. N. W. Distance, 15 miles.

" First part of the road the same as the last of yesterday's, along low reedy ground, following the course of an inconsiderable stream. At 8. 30 came to a pass between two hills, which, in case of attack, is defended by the Kayens by securing large stones with ratans and bamboo work on the tops of the hills ;—the ratans are cut, and the stones roll down on the invaders. It is about one-fifth of a mile in length.

" *8th.* Direction W. N. W. Distance, 12 miles.

" The country more level, with some occasional clearings and a few houses. The jungle to-day was unusually alive with pheasants, pea-fowl, partridges, &c.

" *9th.* Direction W. Distance, 14 miles.

" The country of the same character as yesterday. Halted on the banks of the *Salween* about four hundred yards wide, running a rapid stream in a narrow valley or ravine, except at the small plain where we are encamped, and another on the opposite side on which stands the village of *Banong* [108] or *Yougong*, consisting of about twenty-five houses, having the appearance of a common Burman village. Met 20 or 30 bullocks to-day with stick-lac and eight slaves en route to the Shan country, making in all fifteen since leaving *Laboung*. One family of four were bought for ten bullocks, the father and mother and two children two and three years of age. There are some others for sale at the village. In the evening the son of PHA-BHO, one of the chiefs of the Red Kayens, an exceedingly dirty, stupid-looking lad of about 18 or 20, came over with a relation who is headman of the village. They appeared to have some difficulty in making up their minds who was the proper representative of the tribe. At last it was decided that PHA-BONG was too young and comes to PHA-BHO to consult on state matters ; and that as PHA-BHO was the person who sent the message last year, it is determined I shall go to him. He resides three days' journey on the other side of the river. There have been about fifty or sixty Kayens about my tent this afternoon, (none of them appeared to come avowedly as the young gentleman's attendants ;) they do not differ at all in personal appearance from the common Kayens of the hills, except that they are perhaps less good-looking. Their dress consists of a pair of short trowsers of generally red (particularly the chief's), colored cotton of domestic manufacture, coming about half way down the thigh, and every one had either a piece of book muslin or an English cotton handkerchief round his head.

" *10th.* Waited some time for the boats. At last the young lad of yesterday crossed over, and on my interpreter complaining to him of the delay, he said the Kayens were never in a hurry. He succeeded, however, in getting them at 12 o'clock, and every thing was crossed over that evening. We were in apprehension of a scarcity of provisions, as the old head-man of the village declined supplying any. Pha-bho's son however, procured some rice; as to eggs or fowls, they were out of the question.

"11*th*. Direction N. W. Distance, 9 miles.

"The road to-day was either rocky or covered with round water-worn pebbles, and lay among low rocky hills scantily covered with vegetation and stunted scattered trees. Pha-bho's son was engaged in eating a buffaloe, which he had sacrificed to the *Nats*, and did not accompany us. He sent a guide, however, and is to follow us to-morrow,

"12*th*. Direction W. N. W. Distance, 15 miles.

"First part of the road rocky and bad as yesterday, but the latter part more level and less stony. Passed one or two small villages, around which was a little of the most slovenly cultivation, chiefly *cholum*. Halted at the village of *Bantoe*,[109] of about thirty houses under the nephew of the last Pha-bang (a chief's title). At this village there was a poor woman brought in two days ago, from a party of about three hundred people seized by Pha-bhong from the village of *Tongpak*[106] (Burman Shans) which they left a smoking ruin a few days ago. The story which she told in the fullness of her grief is replete with all the horrors that are attendant on such diabolical scenes. The Kayens attacked the village, it appears, with bravery, (but the Shans are cowards,) and her husband was cut to pieces in her arms, and she kicked by the savages from his bleeding body. Many of the Kayens were killed, but they succeeded in carrying off all the inhabitants. She saw her two daughters in their rapid flight, but was separated from them two days ago. The respectable individual at the head of this village took her as his tenth of the captives taken by his people. She does not know where her daughters are carried to. What adds to the helplessness of her situation, is that she is far gone with child, and is the only one of her village here.

"13*th*. Direction N. W. Distance, 14 miles.

"Reached Pha-bho's residence (called *Dwon Talwee*)[110] to-day after travelling over a succession of hills on the worst possible road.

"14*th*. Sent into the village to say I wished to-day to deliver the letter and presents from the Commissioner, and Pha-bho requested me to come when I felt inclined to do so. I accordingly went in after breakfast about two hundred yards to the village, which consists of seventy houses in the worst Burman style, the chief's much the same as the rest, but made of wood split and fastened together by wooden pegs. There is a sort of open verandah, if it may be so styled, without a roof, at which we arrived by a rough sort of wooden ladder of six or eight steps, all of which were loose. Here we stooped under the roof which reaches within four feet of the verandah or platform of loose boards, and two paces brought us into the door of his Majesty's mansion, from which one step landed us to the royal presence. This, however, I did not for some time discover, as the door at which I entered was the only opening in the room, or rather house, except the crevices between the boards, so that for some minutes after entering it was perfectly dark. I could absolutely see nothing but a little bit of fire that was in the middle of the floor. I seated myself on a carpet, and the people groped their way in with the presents, and after sitting a few minutes I was able to distinguish by degrees objects in the room; not, however, so as to have recognised the old gentleman if I had met him ten minutes afterwards in the day-light. I told him I had come as he had requested, and as the Commissioner of *Maulamyne* had promised last year, from whom I had brought a letter and presents, and wished to open the gold and silver road between us, and be friends with the Kayen nation, &c. &c. He gave me an opportunity of talking, as he said nothing for a quarter of an hour. At last he requested to have the letter read and explained, which was done. He then said his object in requesting an officer to visit him was to know if the English would form an alliance with him,—for the purpose of making war on the Burmans! I declined the honor of a warlike alliance, but told him our views were all peaceable, and that we never made war unless injured, when vengeance was instantaneous. I begged his protection for our traders, &c. &c. &c. He said if we would not make war along with him, he must make friends with us, nevertheless ; but that war with the Burmans was his object in asking a visit, and that he would send for some chiefs from *Ngoay Doun,* and make known my visit, and the wish for a friendly intercourse. He promised his protection to traders, and was as friendly as possible. By this time I could see the size of the room—it was about thirty feet by forty, and a bow end where the door entered. The fire was in the middle of the room on a little square place insulated from the floor, being raised an inch or two from it and supported from below, the roof splendidly varnished with soot. The old man was alone when I went in ; the room was, however, soon crowded, but their whole demeanour was civil and respectful,—very different from what the *Zimmay* chiefs wished me to believe. In the evening the old man's factotum came out to beg me to delay six or eight days, which I declined, and begged to be dismissed on the 17th. This old man, who is an up-country Shan, after giving a splendid account of the numbers of the Kayens and size of their towns, said some of their towns had four hundred houses, and the country was six days' journey from north to south, and four from east to west. PHA-BHO discourages men-catching, but the people pay no regard to his counsels. There is something like law amongst them ; for, on inquiring the cause of the firing of muskets that took place this morning, I was told it was a robber who had been ransomed by his friends for two *ketsees* [111] (copper drum, a sort of gong) and 100 tickals coarse silver. Found our height by the thermometer to-day to be 1021 feet. The flat on which we are encamped, and on which the village is situated, is about 610 paces wide and 600 or 650 long. There is another about 600 feet higher of the same size, and still further up is a third platform 2049 feet above the sea and about two miles square, perfectly level, with rich soil, all under cultivation, watered by two streams which rush down the perpendicular face of the mountain from above and irrigate the two lower platforms. The mountain is of limestone, and its steepest acclivity appears to be on this side, though the presence of the beautiful stream on this face would indicate the country.

" *15th.* Had a visit from the old chief to-day, a dirty shabby old Kayen when seen by day-light. The only indications of his chieftainship were a gold sword and a silver betel-box, both of which he carried himself, and his only attendant was the old Shan mentioned yesterday. He was as silent as before for some-time. He at last began to speak, and continued talking for about an hour of the origin of the human race, to prove what I had said (on his questioning) that the English were the most powerful nation in the world, to be incorrect, or at least uncertain. The pith of his story was, that we were all originally descended from PHA-BEE, a lady who lived at *Ava*. Who our other venerable progenitor was, he did not know, or how the lady happened to come into the world: however, she had three sons, the elder the father of the Chinese, the second of the Kulas (all people not Chinese, Shans, Burmans, or Kayens), and the third of the Kayens. Of the country from which these ancient gentlemen obtained helpmates, he was ignorant. This story was altogether imperfect, and the interpreter a wretched one. However, there is a pagoda some days from this to the northward, on which no nation has yet appeared with sufficient power to put the *Tee* [112] or ornamental covering, on the top; but there is to be a great feast and gathering of all the nations to take place, which he expects every day to be called to attend, when this will be achieved, and a *Natthamee*, or female spirit, will descend, to whom the Chinese, Kulas, and Kayens will each believe their claims equal, and will fight till they are up to the knees in blood. The demi-goddess will then inquire what is the matter. On its being explained, she will end the contest by espousing the chief who can *draw her sword*: it will then be known which is chief amongst nations, till which time he will not believe that we are much more powerful than the great nations named above, especially the Chinese. The magnificence of my tent and brass-bound bullock trunks had, however, their weight with him. He did me the honor to remain four of the longest hours I have spent amongst many very protracted ones in my present mission. He, however, as an equivalent, promised his protection to traders from *Maulamyne* and to people (Chinese included) from the northward, but was afraid they would not find provisions, which will be somewhat difficult, even if he has sufficient influence with his savages to prevent their molesting them. Some of our traders from *Maulamyne* came in to-day (ten) who had gone into the Shan territories subject to *Ava* to the north-east, where they had disposed of their cotton goods to some profit in exchange for horses. They met the Chinese traders who annually visit the town of *Mank Maie* [113], (which is only four days' journey from this,) who had expressed a wish to come to *Maulamyne*, and probably would accompany any of our people who may be there in proper time next year, unless deterred by the terror with which these detestable savages have inspired their neighbours, though I am convinced they are equally despicable and detestable.

"*16th.* Several of the head people came out to the tent this morning, and in the evening I went to take leave of the head-man. They were vociferously discussing the propriety of returning a present to the Commissioner. As soon as I could obtain a hearing, I repeated all I had previously said about the traders, and was begged to explain to the traders coming here that they must not take forcibly what did not belong to them; they promising to do all on their part to protect them if their conduct was correct, but could not be answerable for offences beyond their jurisdiction. They would tell them where they might go with safety; if they went beyond that, it must be at their own responsibility. The discussions were renewed more loudly than before, and I took my departure with a head-ache, partly from the noise, partly from the vile smell of the house. As the grand distinction between the chief and others is his not eating rice, the half of the room was filled with yams, some growing, some putrid and highly offensive After I had returned some time, the old Shan came out and said, the chief wish ed to know distinctly if we considered him our debtor for the things I had given, as he feared it might be brought against his children or grand-children; which is by no means a groundless fear amongst themselves, for I saw on my first visit to *Zimmay* a little child who had been seized and sold by a creditor for a debt contracted by his grandfather for a gong. I assured him his fears were perfectly groundless, and explained what was usual in other countries. He wished me to remain tomorrow, on the chance of his getting a horse to return for the presents. As we have the greatest difficulty in getting—in fact cannot get—rice, and should we be caught by the rains on this side of the eastern hills, we shall be obliged to halt without provisions till they are passable, I intimated my positive intention to start with the moon-light early in the morning to save the elephants crossing the hills in the heat of the day.

"17*th*. Last night at 11 o'clock the old Shan came out according to his promise, bringing a letter for the Commissioner written on two shabby leaves of an old Burman black book, and a little pony, for which my servant had been bargaining in the course of the day; its price was about forty-five rupees. I believe a man from *Maulamyne* who was robbed and is now seeking justice here, was the writer of the letter; and as they have no written character of their own, it was written in Burmese."

Dr. R. quitted *Daung Talwee* this day, and arrived at *Maulamyne* on the 10th May, having returned through *Mein-loon-gyee* by the route already described. He thus sums up the result of his last mission:—

"I need not descant upon the great importance of opening a market with the frontiers of *China* for British goods by means of the caravans of Chinese traders. It is probable that on the first visit of these people to *Maulamyne* their numbers will be few, but when once aware of the safety and freedom from all vexations and exactions with which their visits will be attended, and of the extensive market existing for their goods, I think there can be no doubt we shall see them here in future years in great numbers. I learnt from the people, and also from other quarters during my travels, that no difficulty would exist in our traders visiting the frontier towns of *China*. The Chinese asserted there were no guards and no restrictions in their towns, and a person of some rank at *Labon* pressed me to accompany him next year on a trading expedition in that direction. I cannot but think this subject is worthy the consideration of Government; and should any thing of the kind be deemed advisable, I should be most happy to offer my services.

"An extensive opening for our inland trade has been made by securing the good-will towards us of the Red Kayens, and it is possible that the intercourse with these people now commenced may lead eventually towards their civilization, and that our influence with them may hereafter be successfully exerted in putting an end to their system of kidnapping and selling their neighbours which now forms their, I may say, sole occupation. I learnt that from three to four hundred unfortunate beings are annually caught by these people, and sold by them into perpetual slavery. I met many of them on my journey,—some just purchased, others on their way to be sold.

"The kind feeling of our north-eastern Shan neighbours towards us, have been increased by my late visit. The mixture of firmness and conciliation which

I had it in my power to exhibit towards them on the points discussed, has tended to convince them that we are firm and consistent friends, not desirous of aggrandizing ourselves at their expence, but at the same time not to be imposed on or trifled with."

III.—*Notes on the Antiquities of Bámián.* *By* C. Masson.

Bámián is situated in one of the *Paropámisan* valleys, distant about 80 or 85 miles from *Cabúl,* bearing N. 75 W. The valley is deep, the enclosing hills on either side exhibiting, to a greater or less extent, perpendicular walls of rock, whence their convenience and adaptation for the construction of caves. The rock is called *Mung,* being a conglomerate of small pebbles, sand and divers colored earth, remarkably compact and hard. The length of the valley is about nine or ten miles, in direction from east to west. Its breadth is inconsiderable, but greatest at the particular spot in it, pre-eminently called *Bámián,* and where the statues and principal caves are found. At this point also the streams of *Súrkh Dur,* and *Júí Foládí,* by their junction, form what is called the river of *Bámián,* which flowing eastward down the valley, receives at *Zohák* the waters of *Kálú,* after which winding to the westward of *Irak, Búbúlák, Shibr, Bitchílík,* &c. and augmented by their rivulets, eventually escapes from the hills, and passing *Ghorí* falls into the river of *Kundúz.*

The appellation *Bámián* may perhaps be equivalent to high region in contradistinction to *Damián* or *Damán,* the low region, or that at the skirts of the hills—" Bám" signifies " roof," and when it is remembered that Asiatic roofs are flat, as are in general the summits of the mountains in this part of the country, we are at no loss to account for the name, once probably universally applied to it, though now retained by a particular locality;—and when we further consider its elevation above the surrounding regions, we may admit the figurative and emphatic interpretation of *Bámián,* as afforded by some of the inhabitants, who render it the " roof of the universe."

The mountains among which *Bámián* is situate, are no doubt those designated by the Greek historians and geographers *Paropámisus,* as opposed to the true Indian Caucasus or *Hindu Kosh,* from which they are distinct. The term has been cavilled at, but without justice. It was no creation of the Greeks, but the native name for the hills; nor need we doubt this, when we find it made up of *par* and *pám,* signifying "hill" and " flat." *Paropámisus* may therefore be translated the region of flat summitted hills, and is a term peculiarly appropriate to the countries on which it was conferred. Knowing the etymology of *Paropámisus,* we learn that of PAMIR, the lord of hills.

The principal antiquities of *Bámián* are its idols and caves, which have manifestly a connection with each other,—the castle of *Zohák,* so called—and the remains of the city and citadel of *Ghúlghúleh.*

The evidences of *Ghúlghúleh* are numerous and extensive, proving that it must have been an important city. Refraining from speculation as to its origin, we know from authentic history that it was destroyed by GENGHIZ KHÁN in 1220, A. D. The natives of *Bámián* have a tradition, that it was re-edified, and again fell into decay—which is probable, there being many Muhammedan tombs referring to it, which have a less antiquity than six centuries, if painted glazed tiles to be seen in them, were confined to China, until the era of GENGHIZ KHÁN, as supposed by some authors. The most striking of the remains of *Ghúlghúleh* is the citadel or place, the walls of which encompass an isolated eminence.

The fortress of *Zohák,* so called by the natives and by ABUL FAZIL, occurs at the eastern extremity of the valley, where the rivulet of *Kalú* falls into the river of *Bámián.* We have not inspected it with sufficient attention, to decide upon its character, or to venture to advance an opinion on it, which future research may controvert—we therefore merely observe that, agreeing with ABUL FAZIL as to its antiquity, we differ both from his notion and that sanctioned by tradition that it was a place of defence.

The caves of *Bámián* are found in the cliffs or perpendicular fronts of the hills on either side of the valley, and on the northern side they uninterruptedly occur for a distance of six or seven miles. At the spot called *Bámián,* the elevation of the cliffs, being most considerable, there are found the greater number of caves, or *samuches* as called in these countries, congregated as in a focus. Among these caves stand in niches the two large idols long known in Europe, and between them are two other niches, in one of which are the fragments of a former idol, and the other as certainly once contained one. Opposite to these, diverging to the south-west is the valley through which flows the rivulet of *Júí Foládí,* and eastward of the citadel of *Ghúlghúleh* is a valley stretching to the south—the hills to the north and east of both these valleys are also perforated with caves, and among those of the latter is a large idol inferior only in size to the two superior ones at *Bámián.*

The idols are cut or hewn in the rock, and have been covered with a surface of cement. They are erect figures, with their hands extended, and supporting the folds of drapery with which they have been clothed. Their features have been destroyed, by removing one-half of their heads, or as far as the lips, leaving the hinder halves with the ears, enormously large, appended*.

The work of mutilation was one of some labor, and having been executed with precision, will have been directed by authority, possibly by that of the Arabian conquerors. A subsequent and less systematic mutilation has been practised on the idols, by breaking off their hands, and fracturing their legs, for the merits of which JENGHIZ, TIMU'R, AURANGZE'B, and even TIMU'R SHÁH DU'RÁNNI', who are all accused, may dispute.

The idols stand in vast niches formed in the rock, whose sides on a level with the necks of them have been embellished with paintings. These consist of busts and seated figures, both male and female. The niche of the superior idol has on each side a line of twelve female figures, and, what is of great importance, at its summit, over the idol's head, is an inscription, obviously intended to unravel the mystery. The niche in which stands the second idol in importance has no inscription, but on either side has lines of twelve male and female busts, among which is one so valuable that we need not regret the absence of a literal testimony ; over the head of this idol is a painted full length female figure. The niches of the other idols are also embellished with paintings.

On either side of the niches are series of stairs, cut in the rock, which conduct to their summits or to the heads of the idols—each series of steps leads to a small square apartment, and these several apartments have been superbly decorated with gilding and lapis lazuli. To illumine these passages, apertures have been cut through the rock towards the idols. We ascended to the summit of the second idol by the passage on the one side, and walking round the hinder part of its head, descended by the steps on the other side. Near the summit or above the lines of paintings the niches have been widened, and on either side has been formed a *takht* or sofa, obviously for the convenience of sitting upon. The superior idol has or had the same facilities of ascent to the summit, but at the time of our visit the lower caves near it were occupied by an unaccommodating Tajik, who had stowed in the passage his stock of provender. We could not prevail upon him by menace or entreaty to open the path, and he evasively affirmed that he had never heard of one. We did not insist with him, relying upon making a further visit, which until now has not happened. It is a great point to gain these upper stations, as from them may be profitably inspected the paintings.

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* See a sketch of them published with Lieut. BURNES' Description, J. A. S. vol. ii. 561.

Between the legs of the superior idol are entrances conducting into spacious apartments surmounted with domes—and there are many other caves at *Bámián* which display the dome or cupola:—these we imagine to have been particularly temples. They, in common with all other caves, were covered with cement, in which the lines of moulding surrounding their circumferences, with the ornaments at the summits of the domes, have been formed. The interiors of all of them are of a glossy black color, from the smoke of fires which were or have been kept up in them. Many of the caves at *Bámián* are remarkable for their dimensions, and have other peculiarities in their form and embellishments. The most curious are found above the superior idol, but in another cliff rising backward; so that in walking from them to the front or south, we reach the edge of the perpendicular wall of rock in which that sculpture is carved. In these caves we saw the names written with charcoal of W. MOORCROFT, W. TREBECK, and G. GUTHRIE! They are gained by an ascent a little to the left or west of the idol.

There can be little doubt but that of the vast number of caves, which do not terminate in cupolas, many were the residences of the priests connected with temples; others may have been the abodes of ascetics or monastic classes; and as we find in *Afghánistán* that the cave is invariably the companion of the sepulchral tumulus, without reference to its nature, or whether it be a tomb or cenotaph, we may suppose the majority of the excavations at *Bámián* to be of the same character. When circumstances permitted the erection of a tumulus, it became necessary to excavate a cave—and we need not be surprised at the vast number of caves at *Bámián*, when we have under our eyes the ruins of a large and once flourishing city, or when we consider the spot was a sacred one, possibly the most sacred, of the professors of the then existing religion, and whither the dead of the surrounding regions might, from pious motives, be carried for deposit.

The inhabitants, in speaking of the three superior idols, call them the father, mother and son,—presuming the second in consequence to be a female; but there is no distinction in the figure to warrant the supposition that its sex varies from the others. Of whatever sex the whole may be, there is little reason to doubt but they are of one and the same.

We visited *Bámián* under the idea of meeting with Buddhist antiquities, but it became evident that they were of another character. The inscription was in characters unknown to us, and continued so until we were favored by the alphabets of the *Pehlevi* and *Zend* from Mr. Prinsep, when we ascertained it to be a form of *Pehlevi*. The bust of the king among the paintings in the niche of the second idol, we had found to bear an exact resemblance to the busts on a series of coins constantly and numerously found at *Beghrám*, and which we called Parthian provisionally; but the characters of the legends on these coins were very different from those of the *Bámián* inscription. At length, however, a coin was found of the same class, with the characters plainly similar—in fact comprising three of those forming the inscription (see Plate XLIV). We now began to suspect we had sufficient evidence to assign the idols of *Bámián*.

Under the idea that the inscription might be rendered NANAIA, we had ventured to communicate our suspicions to Mr. Prinsep: should they be confirmed, the idol might be supposed to be an image of Diana or the moon, called by the old Persians NANAIA—but we are not yet confident of the reading; and viewing a succession of idols, it occurs to reflection that they may possibly commemorate a series of sovereigns: and this, even if the reading be allowed; for we find over the second idol which has no inscription, a full length female figure, which may be *Nanaia*, and the first idol has no figure, but a name in its place. We must confess, from the general appearance of the idols, we should suppose them to represent male personages.

The coins referred to are probably of that description marked by Colonel Tod, when he enumerates among his collection "rare ones of a Parthian dynasty unknown to history." The term Parthian may cease to be applicable, but we doubt whether the kings commemorated by these coins, and, as we suspect, by the idols of *Bámián*, are unknown to history. We take them to be the *Kiánian* dynasty, whose records, more or less authentic, are to be found in Persian authors; and whose descendants, if their own accounts be credited, still exist in the persons of independent chiefs in *Seistán*. The Tájiks, so numerously dispersed over *Afghánistán* and *Túrkistán*, and no doubt the more ancient inhabitants of the countries, represent the nation, in olden time, obedient to the princes of this dynasty. For a series of ages, in *Afghánistán* at least, the Tájik authority has been superseded; and, within memory, the proprietary rights of the Tájik to the soil have been seriously infringed by the encroachments of the Afgháns. He preserves few traces of his origin or descent, and as a convert to the uncompromising tenets of Islamism, recollects with horror that his country was once governed by infidels—while, as at *Bámián*, he resides, and follows the ordinary occupations of life, in the temples, from whence his ancestors, in all due solemnity, invoked the glorious sun and dazzling hosts of heaven.

Admitting the evidence upon which we ascribe the idols of *Bámián* to the princes of the *Kiánián* race, without prejudice to their individual character, or whether they be idols of *Nanaia* and other deities, or statues of sovereigns—we naturally turn to consider the possible epoch of their construction; and this, if not absolutely to be fixed, is brought within a certain and comparatively recent period, or one subsequent to the destruction of the Greek-Bactrian monarchy. This monarchy, as Justin testifies, was overthrown by the Parthians, and the fact is perhaps as easily to be credited as that its subversion was effected by the Getæ; though it must be allowed, that in support of the latter opinion, Strabo is very grave authority, particularly when he enumerates the hordes or nations that effected the subversion, the Asii, Pasiani, Tochari, and Sacarauli. It may be, as Schefed hints, that both had a hand in it; but the conclusion by the same learned author that the Getæ remained in possession, may be liable to doubt, if we recognize the *Bámián* idols to be memorials of the Parthian (qy.) conquerors of *Bactria*. It is proper, however, to note, that about this time, the ΑΖΟΣ dynasty, whose coins we have, seems entitled to be considered; and if that appellation have any connection with the name of the first of the four Getic hordes, as, we believe, Mr. Prinsep suspects, both Justin and Strabo may be reconciled; for, according to every appearance, the *Azos* dynasty originated in the regions bordering on the Indus towards its source. At the same time, it must be remembered, that we suggest the possibility only that the *Bámián* idols may refer to the Parthian (qy.) conquerors of *Bactria*. We have remarked that the year 56 B. C. has been mentioned as the epoch of the construction of the idols, (that will be of the more ancient one,) and this epoch might coincide with that of the supercession of the Greek-Bactrian monarchy; but when this date is quoted as being found in the *Mahabharat*, either the authority of that work has been carelessly advanced, or the work itself must considerably abate its pretensions to the antiquity conceded to it by some.

We feel repugnance to renounce old and favorite theories, but they must yield to facts. We had plausibly enough given the Greeks in *Bactria* for successors a race of Getic or Indo-Scythic sovereigns, as we conveniently called them; and we concluded them to be of the Buddhist faith, because we have read that such faith was prevalent in Central Asia about the commencement of the Christian era. Without deeming it necessary to contest the latter fact, in favor of which, indeed, some proof may be adduced, we have gradually, however, grown sceptical as to that of Buddhist supremacy in these regions; and the term Indo-Scythic has yielded to that of Mithraic, which may safely be adopted, as clearly indicating the religion of the ruling powers, while it affects not the question of their race or descent. It may be observed, that the later antiquities in *Afghánistán* and the *Panjáb*, or in the countries along the course of the Indus, are apparently mixed Mithraic and Buddhist; nor is it improbable that the two systems, if they were really generically distinct ones, should have been blended in the limits to which both extended, and were both met—it being considered that Buddhism will have been propagated with vivacity when Mithraism was languishing in decline.

Our objections to the term Parthian, as applied to the coins provisionally so called, and to the princes commemorated by them, and possibly by the idols, arise principally from the impossibility of deeming them *Arsakian*. Under that powerful dynasty, which so long controlled Persia, it is generally understood that the worship of Mithra was discouraged:—we know not why it should have been, and might ask in return, of what religion besides the Mithraic could the Arsakian monarchs have been professors? It may be, that as Parthians, who have been supposed to be of Scythic origin, they were followers after the manner of their forefathers, whose rites it is one of the objects of the *Zendavesta* to depreciate and to condemn: while with the virulent feelings common to sectarians, and in possession of the necessary power to allow their exhibition, they might have neglected no occasion to discountenance the opposite rites and observances in vogue with the people of Cyrus—whence may be accounted for, during their sway, the neglect of Persepolis and the fire temples of *Istakr*. The fire-altar never occurs on any of the coins of the Arsakian princes, while it is seen on those we suspect to be referrible to the princes commemorated at *Bámián*. The same emblem, indeed, distinguishes the coins of the Sassanian princes of Persia, successors in authority to the Arsakian line, and who rekindled the sacred fires throughout the land, which had been extinct for centuries—but on their coins, it is always accompanied by two guardians or defenders—which are wanting on the coins of our princes; and as the more simple may be presumed the more ancient form, we might deduce from the circumstance a corroborative proof, that they are prior in date to the Sassanian monarchs of Persia. Should this view be correct, we learn that cotemporaneous with a portion of the Arsakian dynasty, a powerful and independent sovereignty existed in *Bactriana*, whose princes became of the orthodox Mithraic faith, or that so lauded in the *Zendavesta*. It is obvious also that they must have been subsequent to the Greek monarchy—and who they were, and whence they came, can only be profitably speculated upon, when we become acquainted with the antiquities hidden in the regions north of the Indian Caucasus. It is an advantage, however, to possess the knowledge of their existence, their coins and memorials, which display alike their language and religion.

The height of the larger idols has been estimated at 120 feet and 70 feet respectively; the third may be about 50 feet, and the two others were 35 and 25 feet in height. Surveying them, in connection with the theory that they serve to commemorate sovereigns, the gradations in size, as well as their numbers, may be turned to profit; the former denoting the degrees of prosperity under which they were formed, and the latter authorizing us to infer that there were at least as many sovereigns as idols. It is also probable that these idols, with their accompaniments of caves and temples, are not posthumous memorials, but that they were constructed during the lives of the monarchs who projected them. That they are the labors of a series of kings, is an inevitable conclusion, from the moral impossibility that they could have been formed by a single one.

Supposing that *Bámián* was peculiarly a sacred place, and on that account pre-eminently selected for the burial-place of the sovereigns of the age, we may inquire what evidences we have of their sepulchres. Some ancient authority,—we believe CTESIAS or DIODORUS,—describes the mode of interment of the old kings of Persia—which was by lowering down their remains from the summits of precipices into caves hewn in the rock, and then closing up their entrances. Some of the caves at *Bámián* are so situated, as exactly to come within this description; they are now inaccessible, and from their small apertures could scarcely have been intended for dwellings, while without some such contrivance, as lowering down workmen from the top of the eminence, it is difficult to imagine how they could have been hewn at all. It is proper to observe, that at *Bámián* there are none of the structures now familiarly known to us as topes, and which are so abundant in the regions east and west of the Indus; and their absence might suggest the idea that they were a later mode of distinguishing departed royalty, and originated at the period when the Mithraic and Buddhist practices became mixed. Such a conclusion might be convenient for adjusting that epoch, and to sanction it, the whole mass of Afghán topes might be adduced as proofs, exhibiting the chaitya and the cave: but there is no reason to suppose the chaitya exclusively a Buddhist form, and topes are not irreconcileable with the mode of commemorating Persian monarchs—if the monument at *Múrgháb,* north of *Persepolis,* be really the cenotaph of CYRUS, it being nothing but a chaitya or dahgopa; and we hesitate to believe it not to be the tomb of CYRUS, having the hints of ARRIAN and ARISTOBULUS, and the interpretation of an inscription (we believe found on some contiguous monument, which renders the subject doubtful) by Professor GROTEFEND. Moreover, if it be, we may inquire, where are the dahgopes of the successors of CYRUS ?

The most ancient of the topes of *Afghánistán,* which have been yet examined, we think may be referred to the close of the first or commencement of the second century of the Christian era. While we suppose that *Bámián* may be the burial-place of a dynasty of kings, we mean not to infer that it was also their capital, rather supposing that it was not—although the comparatively recent *Ghúlgúleh* may, nevertheless, be supposed to have been the representative of a preceding ancient and considerable city. The Paropámisus had been, previous to the conjectured period of the formation of the *Bámián* idols and caves, the seat of a considerable power,—that of the Pandava prince SUBHÁG, whose son GAJ, the founder of *Gajni (Ghuzni),* lost his kingdom to EUTHYDEMUS and his sons.

It has been usually conjectured that *Bámián* is the *Drapsaca* of ARRIAN, occurring in ALEXANDER's route from *Bactra* or *Bulkh* to *Alexandria ad Caucasum. Drapsaca* is called *Drastoca* by PTOLEMY, which WILFORD tells us is a substitute for the Sanscrit *Drashatca,* or " the stone city." Admitting the etymology, we need not credit the accompanying assumption that " towns before were only assemblages of huts"—an assumption founded on the caves of *Bámián* being hewn, as indeed all caves are, in the rock—and thereby forming a stone city. If our preceding deductions be correct, they never, strictly speaking, formed a city at all; although one naturally, and as is proved by its remains, grew up and existed in their neighbourhood. Farther, if our conclusions as to the epoch of the formation of the idols be well founded, they consequently did not exist at the period of ALEXANDER's expedition, which may account for no hints being given of them by the classical historians and geographers of the West. We are not certain therefore that *Drapsaca* was *Bámián,* or that a city existed there at all, admitting the probability that a valley so conveniently situated and fertile, was even at that time adequately peopled. The stone city was a term applicable to any substantial one. TIMUR in his march from *Bulkh* to India halted for some days, as SHERIF-U-DIN says, at the " fine city" of *Khúlm.* This is an ancient site, and with *Hybuk, Kunduz,* and any other locality in the route, may have a claim to be considered *Drapsaca. Bámián* has also been suggested to represent

Alexandria ad Paropámisum. The last word appears to be a careless introduction of the geographers for *Caucasum.* We believe it was not used by the original historians—excusable however, when we consider that the ancients deemed the Paropámisus a continuation of Caucasus, and the passes of the hills between *Cábul* and *Bámíán,* are to this day spoken of by the natives as passes of the *Hindu Kosh,* which, strictly speaking, they are not. *Alexandria,* it is clear, was built at the southern base of *Caucasus,* indications of its locality more fully answered by *Ghorbund* and *Beghrám. Bámíán* may be termed south—but widely—of the true *Hindu Kosh,* and, we should think, has little pretension to be considered *Alexandria ad Caucasum,* beyond the doubtful one conferred by vicinity.

Examining the pretensions of *Bámíán* to be considered in another point of view, as a sacred locality, implied perhaps by its being selected as the burial place of kings, we have Wilford's authority, that it is represented in the books of the Buddhists as the source of holiness and purity. This may be of some value, as shewing that the same spot was held in the same venerated light by the followers of two religions generally understood to be very opposite; and as the antiquities are certainly Mithraic, we might draw the conclusion, that the Buddhists have appropriated the property of others, and that the books referring to *Bámíán* are comparatively modern—or we may suspect that Budhism was originally merely a modification of Mithraism. We judge it unnecessary to detail the Mahommedan traditions respecting *Bámíán,* which ascribe, however, the idols to Sa'lsa'l, whom they generally assert to have been a giant infidel, first vanquished and then converted by Azaret Ali; nor need the Buddhist and Brahmanical traditions be noted, with a view to comment, which consider Sharma or the patriarch Shem to be the founder of *Bâmíán,*—because we have no proof that he was, or was not;—but when a writer so talented as Wilford asserts with apparent gravity, that *Bámíán* is the Mosaical Eden, it may be useful to review the grounds on which he bases his opinion and makes an assertion so singular. He is compelled to recognize in the *Landhi Sind Helmend,* the rivers of *Kundus* and *Balkh,* the *Phison, Gihon, Frat* and *Hiddekel* of the Mosaic accounts—but it is plain that he depends upon the statements of the Purános and Zendavesta. The former contain so many evidences of modern composition, that they surely ought not to be brought into competition or comparison with records of high antiquity, as are acknowledged to be those of the Pentateuch. The age of the Zendavesta has been much disputed, some conceiving it of unfathomable antiquity; others, among whom is our countryman Hyde, ascribing it to the epoch of Darius

Hystaspes; while others have deemed it of comparatively modern origin. We are free to confess that we espouse the latter opinion, and the very passages cited in favor of its remote age, we think, are decisive against it. We advert to this subject the more willingly, because we cannot help suspecting the possibility, that the *Zendavesta* was compiled in the court of the sovereigns commemorated at *Bámíán.*

It is worthy of note, that the Brahmans, Buddhists and Mithraists have the same ideas as to the locality of paradise, shewing that they must have acquired them from each other, or from some common source. It is not improbable that the two first adopted them from the last, and it may be conjectured, though it will tell little for the antiquity of the *Zendavesta,* that *Bámíán* may have been clothed with a sacred character, from the very circumstance of its having been made a burial-place of kings—for so the *Zendavesta* itself commemorates, when it describes *Gorotman (Bámíán* or its vicinity) as a terrestrial paradise, and reveals its nature when it figuratively and significantly adds, "the abode of the Supreme Being and the *Blessed.*" There can be no doubt but that the larger idol of *Bámíán* is also the more ancient, and with its accompanying caves became the nucleus, around which all the other caves and idols were subsequently and successively formed; and it is a fair inference that, prior to the construction of the first idol, there was no burial place of kings at *Bámíán,* and none worthy of emphatic panegyrism by the author of the *Zendavesta.*

The remote antiquity conferred by some antiquarians upon the *Zendavesta* is not claimed by its author; and why he should be called Zoroaster who called himself Zerdesht, is only to be accounted for by the desire of theorists to identify him with a celebrated person of that name, who existed, according to authentic history, some centuries before him. Zerdesht so clearly narrates the details of his career, that it is impossible to misunderstand them, and they cannot be more correctly or more concisely represented than in the elegant language of Professor Heeren, one of the most able advocates of the impenetrable antiquity of the *Zendavesta.* The Professor writes—"The works of Zoroaster (Zerdesht) abound in details relating to his own person, as well as the countries and kingdom, which were the first scene of his career as a reformer. He proves by the clearest geographical data, that his native country was Northern Media, Azerbijan, or the territory between the river Kur or Cyrus and the Araxes, both of which empty themselves into the Caspian. Here he first appeared as a legislator and a reformer; but soon quitting this district, he passed into the countries east of the Caspian into *Bactra,* the residence of king Gustasp, who became his disciple and admirer. The original seat therefore of his new religion or doctrine was *Bactra*, whence (under the protection of Gustasp) it was disseminated over *Iran*."

Zerdesht, in giving the name of the sovereign of *Bactra*, his patron, possibly gives that of one of the sovereigns commemorated at *Bámián*. If it be so, we may associate with him Lohrasp his predecessor, and it is deserving of particular notice that the romantic history of Persia ascribes to Lohrasp the construction of a hermitage, to which he retired, abdicating his throne in favor of Gustasp, and from which he was called forth to repel an invasion upon *Bulkh*, (Gustasp being absent at the time in *Seistan*,) when he fell in battle. We perhaps gain from this history a hint as to the origin of the caves and idols of *Bámián*. Having coins with legends, which it is not too much to hope may be interpreted, we may ultimately ascertain these facts, when we shall be afforded triumphant evidence of the age of the *Zendavesta*; and it is cheering to reflect that records are preserved of these kings independent of the *Zendavesta*, itself a most important and valuable one. These records are within our reach, and we have only to distinguish fiction from reality, and history from romance, to acquire a full and satisfactory knowledge of a hitherto dark period.

Zerdesht has accurately described the extent and partitions of the kingdom in which he lived, as justly observed by Professor Heeren; and what he describes we shall allow the Professor also to state for us. "The opening of his *Vendidad* contains a catalogue of the provinces and principal cities of that kingdom; and this record, so invaluable to the historian, is so clear and complete as to leave no room for doubt. The chief provinces and places, sixteen in number, are registered according to their oriental appellations, and for the most part are easily to be recognized. We learn hence that, except *Azerbijan*, to the west of the Caspian, all the countries east of the same, as far as northern Hindustan, were, together with the latter country, subject to king Gustasp, at whose court the sage resided. The whole of *Khorásán* is here enumerated, with the several provinces of which it is composed—*Bactriana* and *Sogdiana*, *Aria* or *Sehestan*, *Cabul*, *Arokhage*, the confines of Hindustan, and finally *Lahore* in the *Panjáb*, are all successively mentioned."

The record of Zerdesht is indeed historically valuable, and describes the extended empire of *Bactria* as it probably existed under Eucratides, and as it may possibly have fallen into the hands of the Kiánians—in many of the countries as we know, and very probably in all of them, are found their coins and memorials. It will be remembered that *Ariana* or *Khorásán*, formed a portion of the *Bactrian* empire, as recorded by STRABO. Professor HEEREN remarks—"Nothing, however, is said of the two chief provinces of the Persian empire, *Persis* and *Susiana*, nor of their capitals, *Persepolis* and *Susa*, nor of *Babylon*, which, nevertheless, were the customary residences of the kings of Persia, and in particular of DARIUS HYSTASPIS." So remarkable an omission will cease to surprise, when probably at the epoch of ZERDESHT, we may suspect those provinces, and also *Babylon*, were under the rule of the Arsakian princes—and therefore could not be enumerated by him as forming part of the kingdom of GUSTASP. They were also under the spiritual influence of those false Magi, in the estimation of ZERDESHT, against whom he is so severe, and whom he stigmatizes a *káfraster*—a term for infidel preserved by Muhammedans of this-day in *kafr*. The possible fact of a powerful independent monarchy in *Bactria* subsequent to the Greek one, gives rise to many singular reflections on the probable relative position it occupied with respect to the Arsakian: and we may divine other reasons besides those already known, which induced some of the latter Arsakian princes to fix their capital at *Babylon*, or rather *Ctesiphon*. We feel, however, that the time has not arrived for delicate speculations, neither can we venture to fix with certainty the epoch of the Kaiánian monarch, but we do feel confident that materials exist to fix it,—and we do cherish the hope that it is possible to destroy that flagrant monster of fiction and prodigy of national vanity, Persian history. If the LOHRASPS and GUSTASPS prove to be Bactrian monarchs, as indeed ZERDESHT tells us they are, we may ask whether Queen HOMAI may not be SEMIRAMIS, and RUSTAM may turn out to have flourished a little before the age of MUHAMMED. The same sources of information are open to us, as were to SHAH ISMAEL when he wrote to SHEIBANI KHÁN, "That if the right of succession to a throne was decided by hereditary descent only, it was to him incomprehensible how the empire had descended through the various dynasties of Peshdadians, Kaiánians and the family of CHENGIS to himself SHEIBANI."

As for the *Zendavesta*, however, it may be admitted that a ZERDESHT flourished in the reign of GUSTASP. It is by no means certain that that work as now preserved was written by him; on the contrary, the dialect in which it is written, would seem to be proof that it was not—for it must assuredly be the most recent of all the dialects of the Pehlevi—if Pehlevi at all; and accordingly on reference to coins, we discover the first traces of it on the very last of that series, (whether Sassanian or Peshdadian) which bears them, and then not in the legends of the coins, but as marks manifestly punched on them after they had been in circulation!

[illegible] submit these [illegible] on the [illegible] with [illegible] [illegible] occasioned by them, in all due [illegible] and [illegible] the [illegible] in the inscription, figures, and [illegible], on which [illegible] based our conjectures, that others may judge how far they [illegible] correct; and it must be noted that the coins which bear legends in the characters of the *Bámián* inscription, do appear to us at least to be [illegible] recent in the class to which they belong. This we consider [illegible] than otherwise; for if they are still Kaianian or Peshdadian, we may be able to find other caves and hermitages for Lohrasp and Gushtasp—it being remembered that we are yet standing only on the threshold of discovery.

Kabul, June, 1836.

V.—*New types of Bactrian and Indo-Scythic Coins, engraved as Plate XLIX.* By James Prinsep, *Sec. &c.*

I did not expect to be again so soon summoned to resume the graver in the department of Bactrian medals; but to do so when such novel and interesting specimens are handed to me, is no less an obligation than a pleasure.

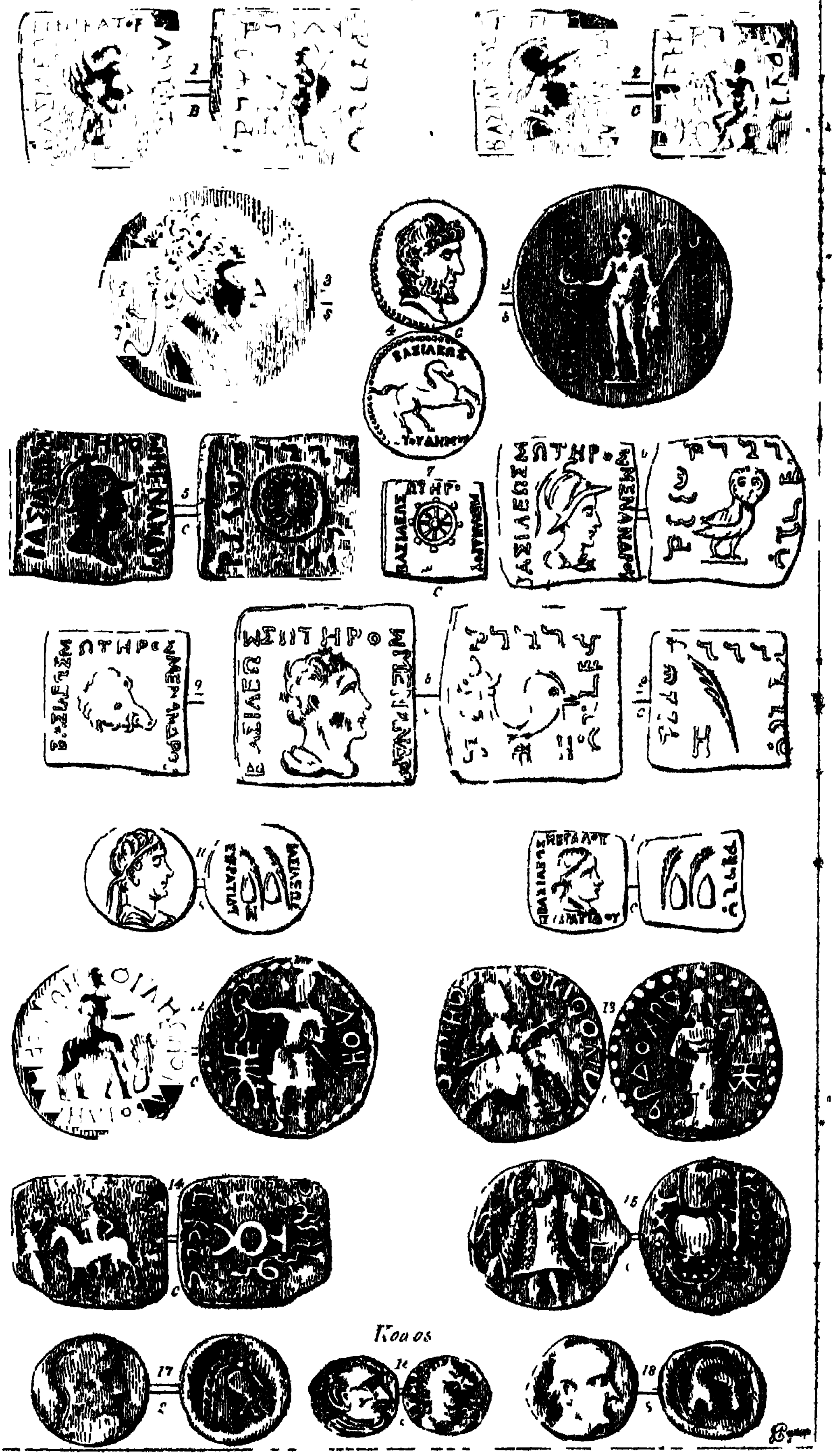
The two main attractions of my present plate are represented with scrupulous regard to fidelity, from the coins themselves, which were entrusted to me for the purpose by their fortunate possessors, as soon as they were discovered.

No. 1 is an unique of *Amyntas*, a name entirely new to *Bactria*; it is a square coin of bronze lately procured by Colonel Stacy from the *Penjáb*, in excellent preservation.

Obverse. Bust of the prince wearing a curious cap, which may possibly represent the head of an elephant, but from the worn surface cannot exactly be made out—legend on three sides of the square, ΒΑΣΙΛΕΩΣ ΝΙΚΑΤΟΡΟΣ ΑΜΥΝΤ (ου).

Reverse. A standing figure of Minerva, with helmet, shield [illegible] spear—her right hand extended in token of peace. Square [illegible] [illegible]. Legend in Bactro-Pehlevi [illegible] [illegible]*jalude amido.* It will be at once perceived that the native epithet corresponding to νικατορου is the same as that for νικηφορου on the coin of Archelius published in my September number, (page 548,) and before on the coins of Antialkides and Antimachus, with [illegible] only of the first letter. The word was there read [illegible] [illegible] ʔ [illegible] substituted for [illegible], or broad a of the *Archelius* [illegible] *Amyntas* coins. The third letter in those cases is also rather an [illegible]

Bactrian Coins



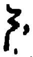
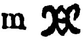
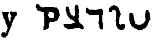
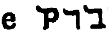
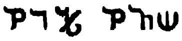
l, than , of which the value is as yet unknown. I have called it *l* ad interim.

Fig. 2 is, if possible, a more valuable acquisition than the above, being the first queen of *Bactria* yet discovered. Dr. Swiney obtained the coin among Kerámat Ali's collection. It was thickly coated with the rust of ages, and, from the helmeted head on the obverse, was looked upon as a Menander, until the Doctor set about cleaning it carefully with a hard brush, and, perceiving a variation of the legend, shewed it to Captain Cunningham, who immediately recognized with a feeling of intense curiosity the undoubted title of a female sovereign ΒΑΣΙΛΙΣΣΑΣ ΘΕΟΤΡΟΠ (ης) ΑΓΑΘΟΚΛΕΙΑΣ—"of the queen Agathoclea, the god-nourisher." This very curious epithet θεοτροπη, a word not to be found in the lexicon, must have been coined on purpose for the queen-mother, after the oriental style of flattery, in allusion to her royal offspring.

Reverse. Hercules seated on a rock (or a *morha*), resting his club on his right knee—monogram . The Pehlevi legend is most unfortunately so indistinct in one or two places, as to preclude the possibility of our making out the true reading. The first word seems to differ in no way from the ordinary  *malakáo*, king: and the second would appear to be  *raduko*, σωτηρος; then follow two short words  which I am totally at a loss to expound, though the individual letters are clear enough.

To these two uniques I have subjoined some new types of Euthydemus, Menander, and Eucratides, which have not yet been engraved, though some have appeared in the lithographs of Masson's drawings.

Fig. 3. A silver tetradrachm of Euthydemus, now in Dr. Swiney's cabinet, having a standing Hercules on the reverse, in lieu of the seated figure. The coin must have been originally very beautiful, but we learn from the memorandum of Kerámat Ali, who purchased it at *Cabul*, that it was taken to Dr. Gerard, who deemed it spurious or not silver*; this induced the vender to put it in the fire (cased in clay) to ascertain the fact, and the smoothness of surface, and clearness of outline were thus destroyed. The *beaux restes* are still sufficient to excite admiration.

Fig. 4 is from Masson's drawing of a small copper piece of Euthydemus. The reverse has a naked horse prancing. Legend as usual, ΒΑΣΙΛΕΩΣ ΕΥΘΥΔΗΜΟΥ. Masson has another similar, but larger.

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* Probably it was covered with a coat of muriate, like my Euthydemus.

Fig. 5. A square copper coin of Menander, procured by Dr. Swiney at *Agra;* in good preservation.

Obverse, the usual helmeted head with the legend ΒΑΣΙΛΕΩΣ ΣΩΤΗΡΟΣ ΜΕΝΑΝΔΡΟΥ.

Reverse, the circular shield of Minerva with Medusa's head: the features of the face only worn smooth: legend in Pehlevi שווק טורצק רברק.

Fig. 6, from Masson. The *reverse* here presents the bird of Minerva, so common on the Athenian coins; in all other respects the coin is similar to the last.

Fig. 7. *Obverse* of a smaller copper coin from Masson. In the centre is a wheel with eight spokes, distinctly so delineated, otherwise we might have supposed it the shield with Medusa's head; the Greek legend surrounds it. The reverse is the same as that of fig. 9.

Fig. 8. In this larger square copper coin Mr. Masson gives, as a new reverse, a dolphin; but from the appearance of the sketch it is possible that the original may have been an elephant's head—a common device on Menander's coins.

Fig. 9. On this the sovereign's portrait is replaced by a boar's head according to Mr. Masson's sketch, and on the reverse is a simple feather or palm branch: monogram H—legends Greek and Pehlevi as usual.

Figs. 10 and 11. Two specimens from Masson's collections, one silver, one copper, to shew that the coins of Eucratides sometimes bore the emblem peculiar to Antialkides*, two conical beehives and two feathers or palm branches.

Fig. 12. An addition to our Indo-Scythic group of the elephant rider, or Kenranos. Col. Stacy has just obtained four from the *Panjáb;* all evidently from the same die, but not one containing the legend complete. To save space I have filled it up from the united specimens, and there can be no doubt of a single letter, barbarous as the context appears. *Obverse.* Rája astride on a small elephant, legend (commencing from the right of the head) ΟΙΛΗΩΗ ΟΙΛΡΟΙΛΗΙΛΗΡΟΛΙΩΗ, of which nothing can be imagined but a barbarous attempt at ΒΑΣΙΛΕΩΣ ΒΑΣΙΛΕΩΝ ΣΩΤΗΡΟΣ, the syllables ΙΛ, ΩΣ, or ΩΝ, and ΡΟ being the only happy conjunctions seized by the ignorant die-cutter.

On the *reverse* the standing figure of ΑΘΡΟ is depicted, with the common monogram, but the legend differs; being ΛΟΗ, or inverted

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* This name has hitherto been always written (on Masson's authority) Antilakides. M. Jacquet corrected it from the Ventura coins, and on re-examination of the silver coin in Dr. Swiney's possession, his reading is corroborated. It also corresponds better with the Pehlevi which is פלפאהלבק quasi, *ati-alikudo.*

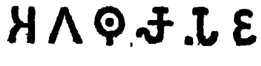
HOV. The same is met with on one of the couch-lounger coins extracted from the Manikyála tope, (see fig. 29, Pl. xxii. Vol. III.) It may possibly be a perversion of the tri-literal MAO. But the horns of the moon do not appear on the shoulders.

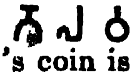
Fig. 13. A rare and valuable variety of the Kenranos coin in Dr. Swiney's cabinet, of which Captain Cunningham has a less perfect duplicate; the obverse legend, hardly legible, must be PAO NANO PAO, &c. The reverse has the standing female figure with the horn of plenty, and legend APΔOXPO, as on the gold coins of the same device.

Fig. 14 should have been introduced in my last plate, among what I have supposed the fourth series of APΔOKPO imitations. This coin, of which Dr. Swiney possesses several equally legible, has the legend APΔOXPO quite distinct, proving that this group must be regarded, not as an imitation but as the direct descendant of the Mithraic series in the Kanerkan line. The appearance of Nágari on one of my coins must be regarded therefore as Greek. It is curious that Masson should not have detected a single letter on all the specimens he amassed. Some faint remains of them are traceable on those from Behat.

Fig. 15 is a duplicate of Masson's coin, fig. 15, of my last Bactrian plate, in Dr. Swiney's possession. A few of the Pehlevi characters are better made out, but the proprietor of this coin still eludes us.

Figs. 16, 17, 18. I terminate this plate with three coins of Kôdes in Capt. Cunningham's cabinet purchased from the late General Arnold's collection, of an entirely new reverse. They are all of silver, deeply indented to throw the head out. The letters KШΔ.. are visible on the smallest of the three, which is otherwise of the best execution. The horse's head of the *reverse* gradually deteriorates until it can be no longer recognized (as in 18) without the earlier coins as objects of comparison. On cleaning one of my Kôdes coins, it was found likewise to have the horse's head reverse; and the horse has been since traced to the *Chouka Dooka*, or degraded Saurashtra series, in some specimens also purchased from the estate of the late General Arnold.

Postscript. I cannot delay one moment announcing a very successful reading by Professor Lassen of Bonn, of the native legend on the coin of Agathocles depicted in Vol. III. Pl. ix. fig. 17, by Masson, and again engraved last month as fig. 9 of Pl. XXXV. The following is an extract from the Professor's letter this moment received. "The legend on the coin of Agathocles, is in my opinion, in another character, and I think we may recognize in  the letters अगथुक्लराज, *Agathukla rája,* reading from the left to the right. The first two letters are self-evident—the third is similar enough to the Tibetan and Páli forms of *th* with *u* below: the fourth letter expresses *kl* quite in the Indian manner. If I am right in this, it will be necessary to give to Agathocles a very different position from that assigned to him by Mr. Raoul Rochette."

The principal objection to this highly plausible solution of the Agathoclean legend is, that nearly the same characters also appear on the coins of Pantaleon. There are differences to be sure, and it might be possible to assimilate the word to the Greek, on the supposition of the first syllable being wanting—thus  will form .. *talava* or .. *talao*... the next letter on Masson's coin is a ϵ, *j*, and on Dr. Swiney's a *t* or *n*, but on both coins there are three letters to the left of the female which still remain an enigma.

I have also just had the opportunity of perusing M. Jacquet's first paper on the Ventura coins, but as this merely enumerates their Greek legends, postponing the consideration of the Bactro-Pehlevi, there is nothing in alteration or correction of my own list excepting the termination of some of the names, *Kodes, Lysias, Vonones* (?) for *Nonus, Azes,* &c. M. Jacquet had remarked the connection of the Hindu coins with their Indo-Scythic prototype when examining Col. Tod's collection, but had not published his sentiments.

V.—*Facsimiles of various Ancient Inscriptions, lithographed. By* James Prinsep, *Sec. &c.*

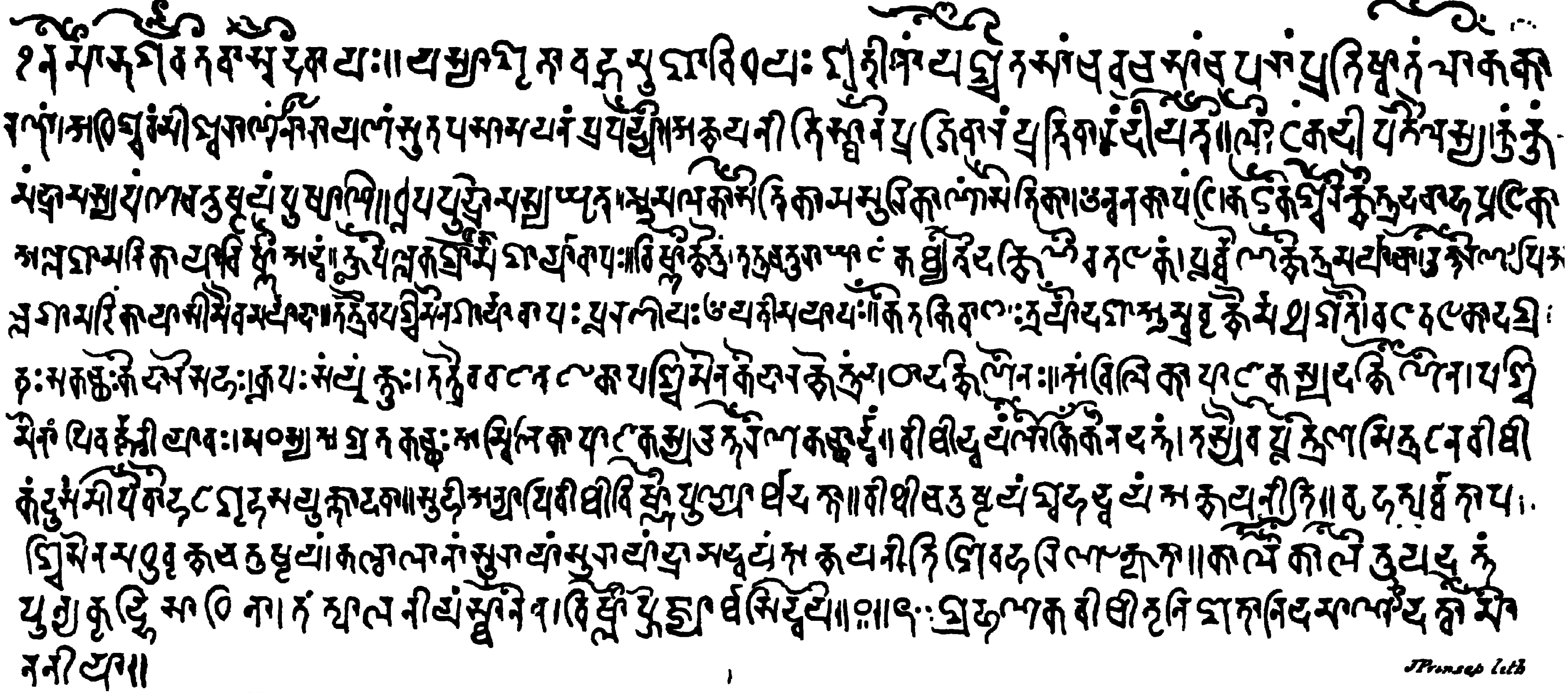
[Continued from page 661.]

Stone Slabs in the Society's Museum.

Many of the inscriptions in our Museum bear no record, either of the places whence they come, or of their respective donors. Unless therefore they contain in themselves such information as may supply a clue to their origin, the greater part of their value is lost. Publication may in some cases lead to their recognition, and this is one of my motives for including them in my present series of lithographs; a stronger motive is, the example they furnish of the variation of Devanágari character prevalent at different epochs; which it is desirable to place in an accessible position for reference, before we can undertake a comprehensive review of the palæography of India.

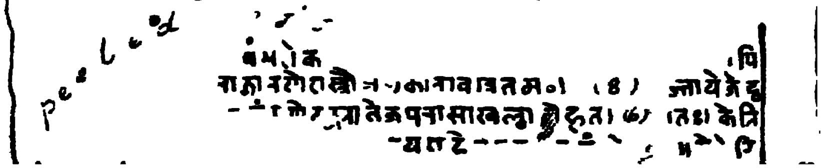
The inscription, marked No. 5, in the Museum (Pl. XXXIII.) is neatly cut on a stone, about 2½ feet long by 1½ feet broad. It is nearly in the same character as that of the *Shekawati* inscription, pub-

Facsimile of an Inscription on a stone in the Asiatic Society's Museum marked No 5.

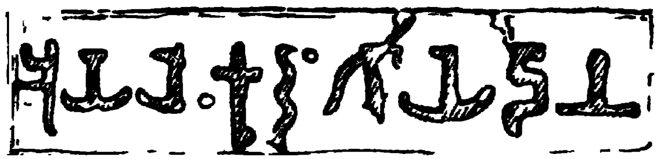


J Prinsep lith

Facsimile of a Mutilated Inscription from Chunar



Old Inscription from Buddha Gaya.



lished in my last volume. There are, however, some peculiar forms, as the *kh*, the *gh*, the *a*, &c. Hardly any of the letters in the whole inscription can be regarded as uncertain; I have had therefore, no difficulty whatever in preparing the following transcript in modern Devanágarí. But as to the interpretation, after receiving a formal certificate from the pandits of the College that, with exception of the verses at the commencement and conclusion, the body of the inscription was not Sanscrit, or was so ungrammatical as to be quite unintelligible, it may be conceived that I was somewhat staggered! However, on conning it over word by word, with a paṅdit better versed in the out-of-the-way terms employed, the general drift was readily made out, although the connection in many parts still remained broken, and the sense doubtful. As there is neither date nor allusion to any reigning monarch, the fragment is of no historical value; but it may be a curious study for the Sanscrit scholar.

Transcript in modern Devanágarí character.

१ नमो भगवते वासुदेवाय॥ यस्याप्र*ता बहुमुखा विषयः श्रुतीनां यश्चेतसांच वचसांच परा प्रतिष्ठा। तं लोककारणमशेषरमीश्वराणां।नारायणं सुतपसामयनं प्रपद्ये॥ अक्षयनीतिस्थाने प्रतिवारं प्रतिवारं दीयते लोके दीपतैलस्य। कुंकुमद्रामस्य पणचतुष्टयं पुष्पाणि॥ धूपपूद्रामस्य इतं॥ आमलकानां सेतिका मसुरिकाणां सेतिका। उत्पन्नकापटिकेकेश्वरे क्षेत्रं वराहप्रटिका अक्षगामरिकाया विष्णोश्चद्दं॥ उपेक्षकयामगार्थावापः। विष्णोःक्षेत्रं। तत्र चतुराघाटं कथ्यते दक्षिणेन वटकं पूर्व्वेण क्षेत्रमर्य्यादा उत्तरेणापि अक्षगामरिकायाः सीमैव मर्य्यादा। तत्रैव पश्चिमेन मार्यावापः पूरणीयः उपतीमर्य्यादः केतकिवाटः चयोदप्रश्चाचट्टेक्षेमध्यगतो वटतटकाद्यतःसकक्षः केदारेसदः। कूपःसंयुक्तः तत्रैव वटतटका पश्चिमेन केदारक्षेत्रं हुढ दक्षिणेन॥ चंचिलिकापाटकस्य दक्षिणेन पश्चिमेनापि वर्ण्णीयावः मकस्य अपतकक्षः अम्बिलिकापाटकस्य उत्तरेण कच्छार्द्धं॥ वीथीद्वयं लोकिकेन दत्तं तस्यैव पुत्रेण मिनटेन वीथी कन्दसमीपे वोचटग्टहसंयुक्ता दत्ता॥ सुतोऽप्यन्यापि वीथी विष्णोः पुण्यार्थं दत्ता। वीथीचतुष्टयं ग्टहद्वयं अक्षयनीति॥ इहतत्पर्व्वताः पश्चिमेन मधुक्षचतुष्टयं कल्याणानां सुरायां सुरायां द्रामद्वयं अक्षयनीति प्रिवस्तरिणा कृता॥ काले कालेतु यद्दत्तं पुण्यकृद्भिः समाधिना। तत् पालनीयं स्थानेन विष्णोः पुण्यार्थं सिद्धये॥ मच्छकवीथी चीनि शतानि द्रमाणेद्त्वा कैानमीया॥

Translation.

Salutation to the divine son of Vasu Deva, (Krishna.) We adore with becoming reverence Náráyana, ~~lord~~ of lords, creator of the three worlds, source of the holy precepts of the vèdas, whose praise is beyond speech and thought.—For the abode of the eternal† day by day the pious offer up lamps of oil; of saffron‡ and asafœtida four

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* This should be ष्टि.   † A Vaishnaví temple so called?

‡ *Kunkuma-dráma;* the whole of this passage is very obscure, and full of orthographical errors.

*pans**: of incense, *dron* flowers, ghee, *amalika* (myrobalan fruit) a *sèr* weight; *masuri* pulse, a sèr; of dry-wood perfume *(indan)*; *davaha* (?) 16 pans.—(Here follows apparently an enumeration of landed property belonging to the temple or *Vishnu-khètram*)—*Allagamarika* (?) a road,—*Upa allaka*, a small village, with a good tank having four pucka ghâts. They say on the south is a *baṛ* tree; on the east a boundary wall; on the north the wall of Upallika village; on the west a bazar and old tank, where is also a wall. Between the *baṛ* and a great many mango trees are 13 *ketaki*† trees. Also hard by, a well with a cattle-trough attached. On two sides of the *baṛ* tree a chabutra is built, on the west a boundary wall: farther off to the south, a tamarind tree, on the south and west are two roads, and a police *chaukí*‡: further on a drinking trough. On the north of the tamarind tree, half a trough; item two rows (shops) built by Lokika; whose son, named Mitrata, built a row, a cistern, and a handsome dharmsála. Another lane also, two houses and four bazars, for the *Vishnu-khetra*, bounded to the west by several large hills,—four *mauwa* trees, two pottery and distiller's shops (?) were severally given by Siva Hari, another son. (Verse.) Whatever has been thus presented to Vishnu, may they for ever hold sacred; and let nobody abstract the house, the bazars, (300 ?) nor the numerous trees.

Seoní grant, Plate XXIII. et seq.

For this ancient document I am indebted to Mr. D. M. McLeod, assistant to the Commissioner of the *Nerbudda* territories, who stated, on sending me a copy of the first plate, some months ago, that it was one of five in the possession of a native zemindar in the *Seoní* district, supposed to be a *jatas* or *sanad* confirming lands granted by former *Goand* chiefs, but wholly illegible to the pandits of the *Nerbudda* district. Recognizing the character as identical with that of the *Chattisgarh* inscriptions, published by Mr. Wilson in the Asiatic Researches, vol. xv. page 507, I supplied Mr. McLeod with this alphabet and with a transcript of the plate in modern Nágarí, of which the sense, however, could not be wholly made out for want of the context. Through absence of leisure, and illness of his pandit, the discoverer has been obliged to relinquish his laudable desire to decypher the document on the spot, (where he might, doubtless, have been aided by the names of the countries and villages mentioned in the grant,) and to entrust a faithful copy of the remainder, made with great care by his young native friend Mir Jáfir Ali, (who has performed his task remarkably well,) to our more hazardous attempts in Calcutta.

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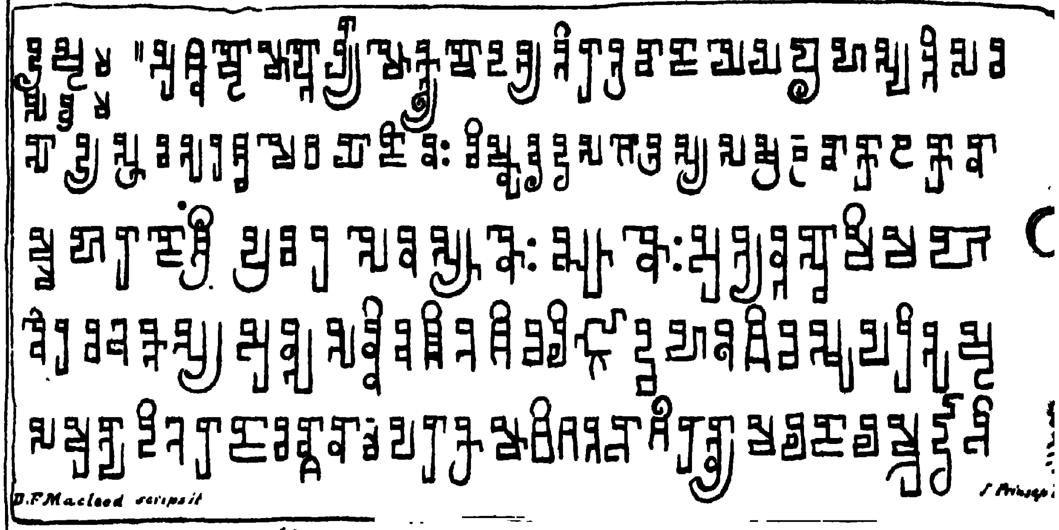
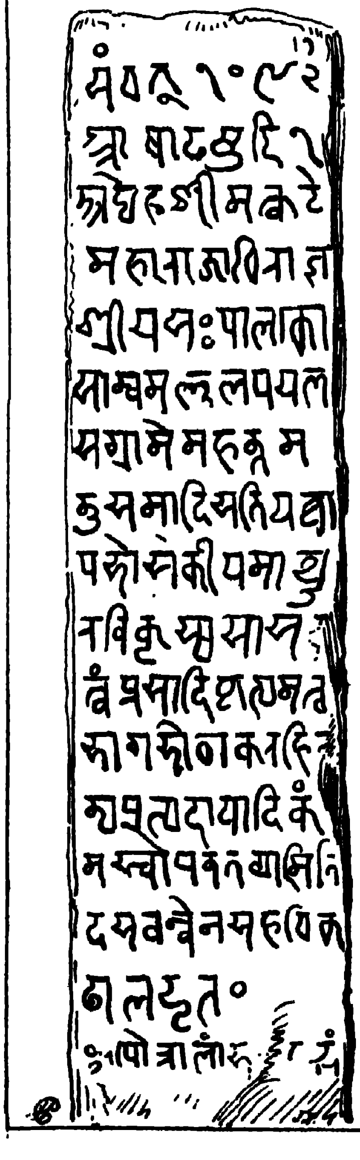
* 8 Tolas. † Pandanus odoratissimus. ‡ *Bhath.*

One of 5, Copper Plates in possession of a zemindar at Seoni.

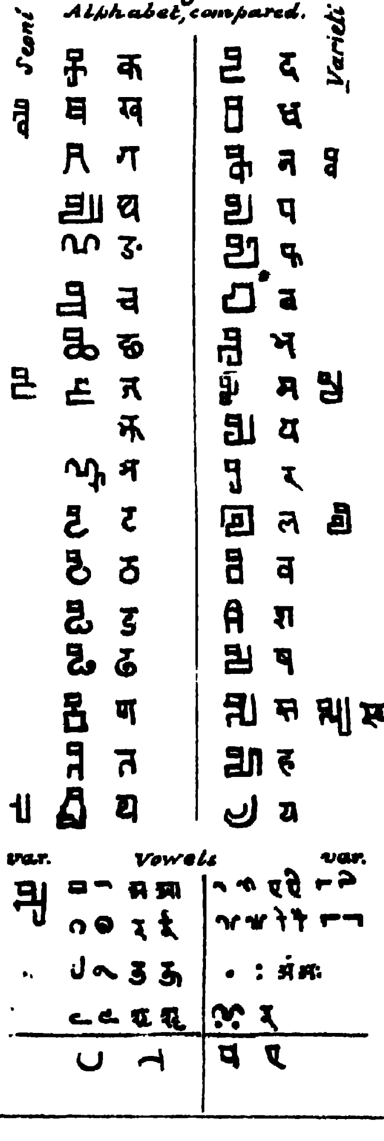

D.F. Macleod scripsit

J. Prinsep

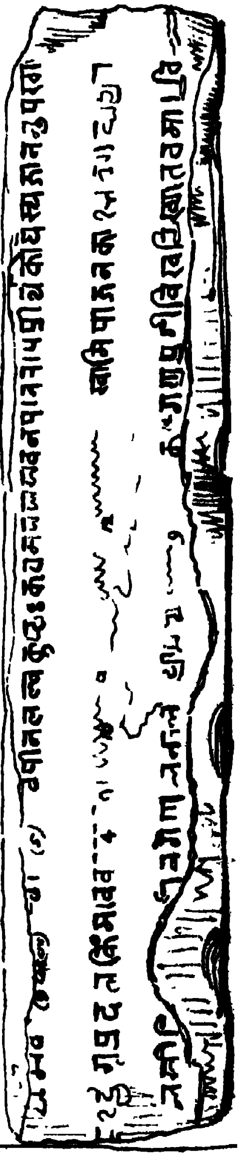
FACSIMILE of No 6 of MUSEUM. An Sam. 1035.



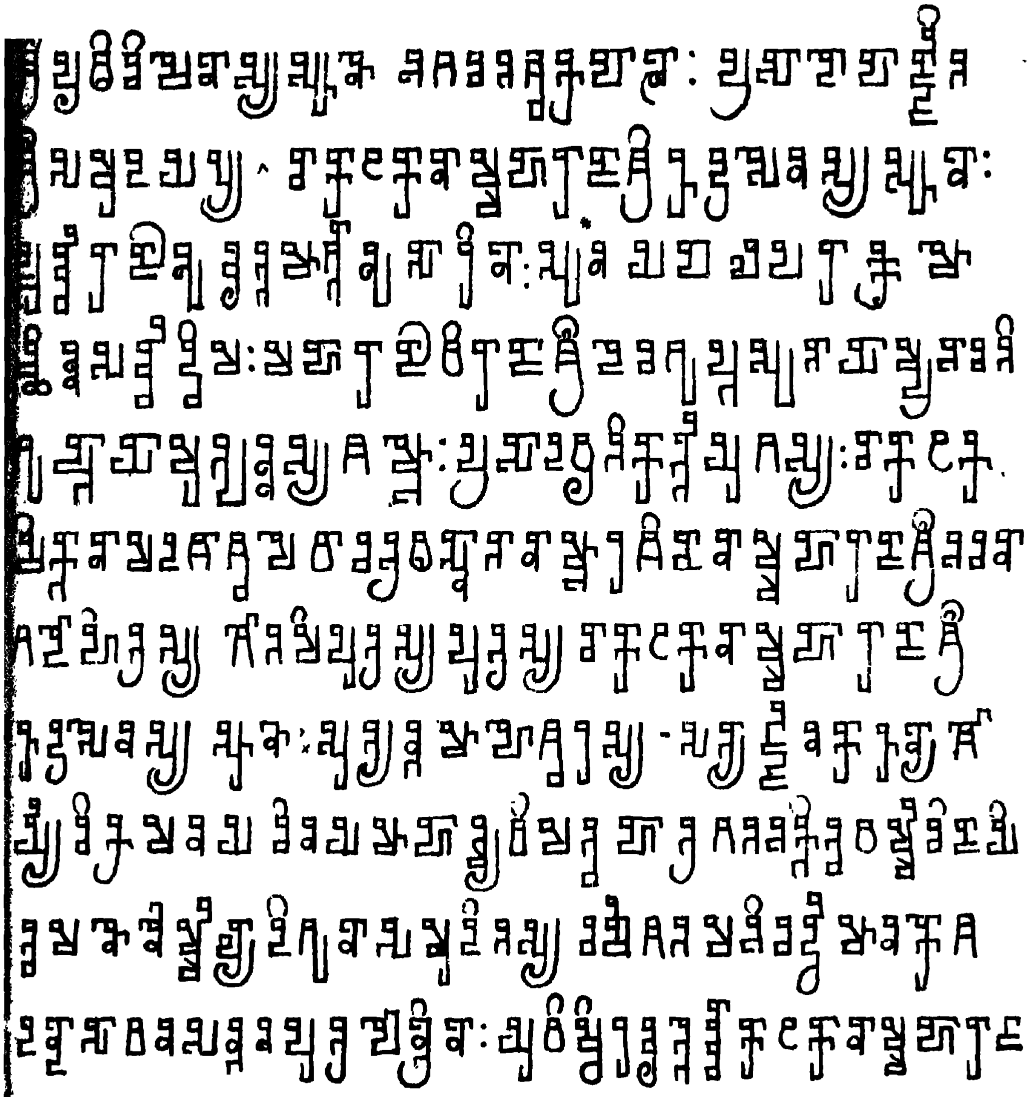
Chattisgarh Alphabet, compared.


Seoni
Varieties
var.
Vowels
var.

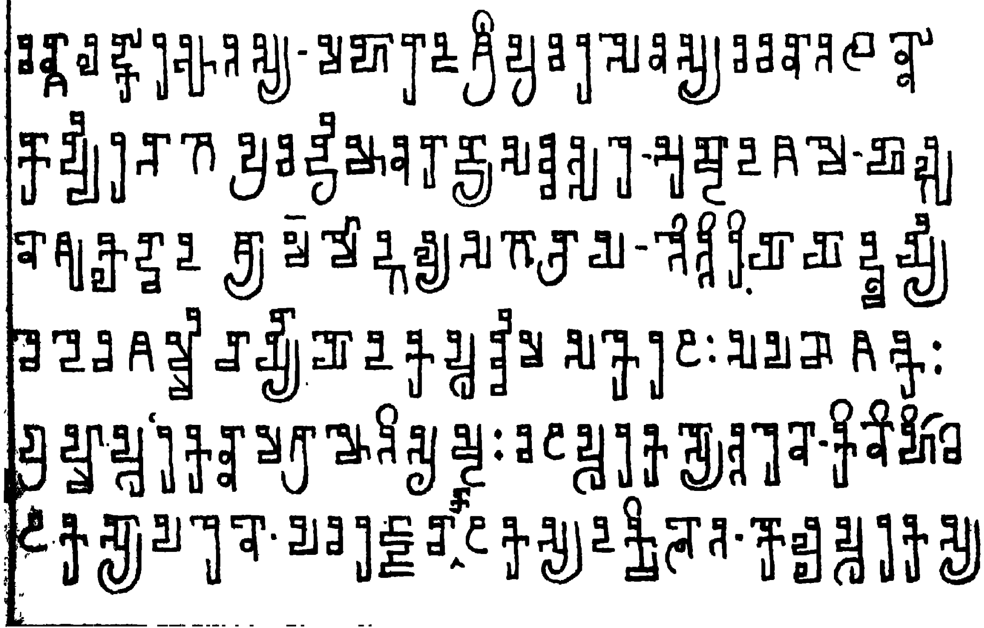
Second Inscription from Chunar, in As. Soc Museum.



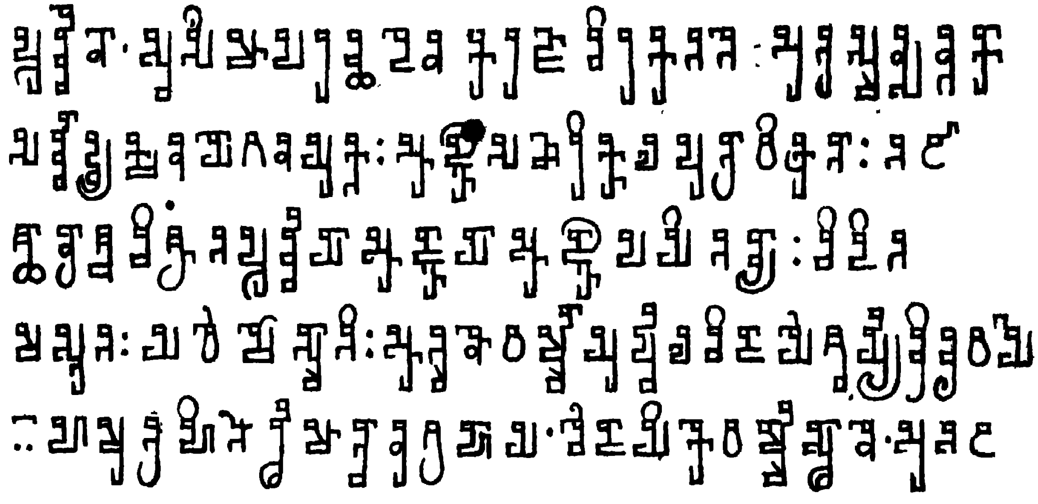
Second Plate of the Seoni Grant.



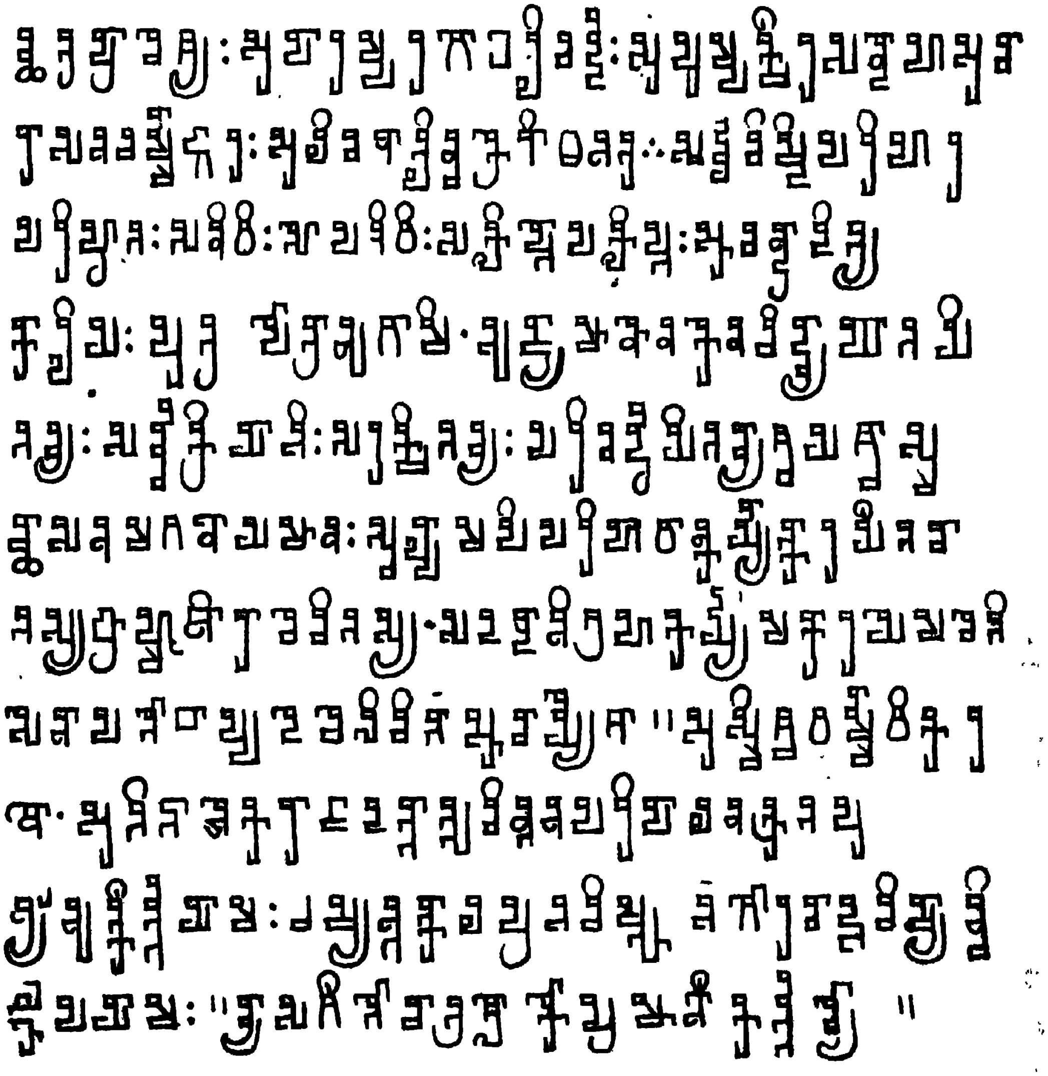
Third Plate, one side.



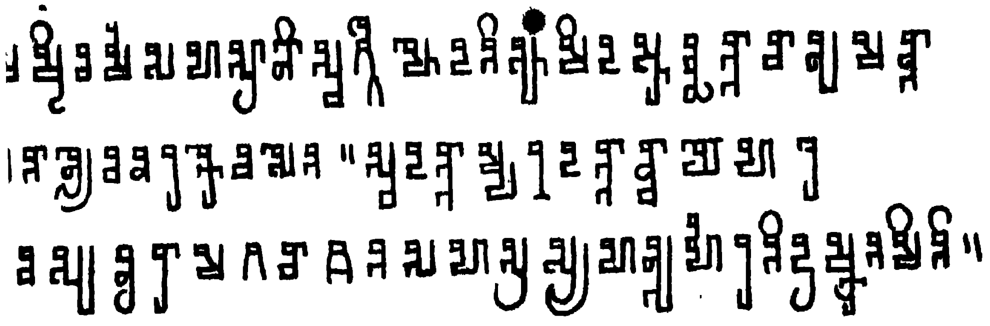
Third Plate continued



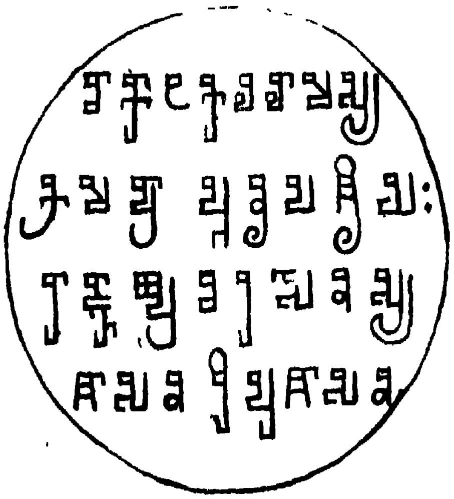
Fourth Plate



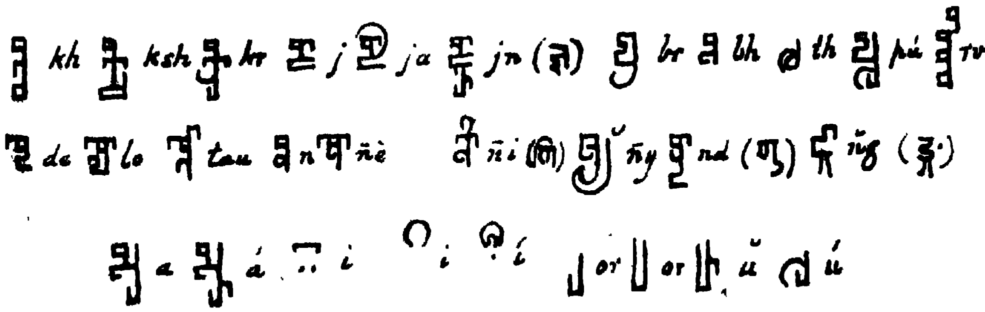
Fifth Plate.



Inscription on the Seal.



Letters peculiar in form.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J. Prinsep lith.

Printed at the Oriental Lith. Press Calcutta

Received only within the last week, I have been so hurried in transcribing, translating, and lithographing, that I fear full justice has not been done. The order of the plates having been lost by taking them from their binding ring, I had to guess it from the connection of the reading—and on revising the first translation, with the aid of a second learned pandit (Kamala Kánt), I found I had inverted the order of the two sides of the second plate in the lithograph, which I was unable to correct, before printing it off. I have also omitted the first syllable *stha* of *sthánè* where this word is repeated in the first page of the lithograph. The rest is, I believe, pretty correct.

The character in which the *Seoní* plates are written, when deprived of the open parallelogram at the head of each letter, is so closely allied to No. 2 of the *Allahabad* láth, that there could have been but little difficulty in decyphering it, even without the aid of Srí Varma Suri's alphabet, which Mr. Wilson seems from his words to have applied with considerable distrust at that period*. There are indeed notable deviations from the *Chattisgarh* type† in several letters, as well as invariably in the application of the vowels. I had inserted Varma Suri's alphabet in Plate XXXIII. with a few variations marked. I have now further noted some of the chief peculiarities at the foot of the last plate.

Concerning the purport of the inscription little need be said. It is an ordinary grant by one Rája Pravara Sena, of a piece of ground in a conquered district to his officiating priest, in perpetuity :—but neither the country nor the boundary villages mentioned, nor any of the said Rája's family can be recognized! The dynasties of *Cuttack,* the nearest resembling *Vákáṭaka* in sound, exhibit no such names as Pravara Sena, Rudra Sena, Prithivi Sena, Rudra Sena ; and again Pravara Sena, who successively reigned over this unknown province. That they were of an inferior grade is shewn by their simple title of *Mahárája,* while Deva Gupta, whose daughter was married to one of the line, and was mother to Rudra Sena II. is styled the paramount sovereign *(Mahárája Adhírája).* This is the second instance within a year of our finding the record of a matrimonial alliance with a *Gupta* family, which we can suppose to be no other than the one now so well known to us through coins and pillars. The present name Deva Gupta, however, is an addition to our still growing catalogue.

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* "After two months the pandit was again called on without previous notice or preparation to read his copy of the original, whilst his reading was checked by careful reference to the Devanágarí transcript." As. Res. XV. 507.

† M. Jacquet has sent me from Paris the facsimile of a plate in the Tod collection, which corresponds more closely with the Chattisgarh plates.

What would have added still more to the value of the present document, is the exact date it cites, were it not unfortunately in an unknown era, entitled *Pravarddhamánarajya Samvat :* it may, however, bear the interpretation of "date of the growing (or current) reign" which I have adopted in the translation. At any rate, the omission of the now common dates in all these early records proves that the *Vikramáditya Samvat* was not then generally in use.

The omission of a benedictory invocation at the head of the inscription is a curious circumstance also noted in the *Chattisgarh* grant. The initial word *Dristhamasi,* may possibly be equivalent to "Take heed"— or "By these presents." Some of the epithets, especially those applied to the piece of ground, are too far-fetched even for a guess solution by KAMALA KÁNT and RAM GOVINDA, whose ingenuity has good reason to be admired even in those I have attempted to render into English. They refer to practices of petty exaction not uncommon among feudal chieftains.

Transcript of the inscription in modern character.

On the seal. . . . . .
वाकाटकललामस्य
क्रमप्राप्तनृपश्रियः
राज्ञः प्रवरसेनस्य
शासनं रिपुशासनं

दृष्टम
सिद्धम } अग्निष्टोमाप्तोर्य्यामोक्थषोडश्यतिरात्रवाजपेय बृहस्पतिसव
साद्यस्कचतुरश्वमेधयाजिनः विष्णुवृद्धसगोत्रस्य सच*ट [*सम्राजः काटकाना
म्महाराज श्रीप्रवरसेनस्य स्थाने स्थाने अत्यन्तस्वामिमहा
भैरवभक्तस्य हृन्दुसन्निभश्रितशिवलिङ्गोद्वहनशिवस्य परितुष्ट
समुत्पादितराजवंशानाम् पराक्रमाधिगतभागीरथ्यमलजलमूर्द्धाभि
षिक्तानाम् दशाश्वमेधावभृथस्नातानाम्भारशिवानाम्महाराजश्री
रुद्रसेनस्य स्थाने अत्यन्तमाहेश्वरस्य सत्यार्ज्जवकारुण्यशौ
र्य्यविक्रमनयविनयमाहात्म्याधिमत्त्वोपगतभक्तित्वधर्म्मविजयि
त्वमनोनैर्म्मल्यादिगुणसमुदितस्य वर्षशतमभिवर्द्धमानकोश
दण्डसाधनसन्तानपुत्रपौत्रिणः युधिष्ठिरवृत्तेर्व्वाकाटकानाम्महाराज
श्रीपृथिवीषेणस्य स्थाने भगवतश्चक्रपाणेः प्रसादोपार्जित
श्रीसमुदयस्य वाकाटकानाम्महाराजश्रीरुद्रसेनस्य स्थाने
पूर्व्वराजानुवृत्तमार्ग्गानुसारिणः सुनयबलपराक्रमो
पिहितसर्व्वद्विषः महाराजाधिराज श्रीदेवगुप्तस्य सुतायाम्प्रभावती
गुप्तायामुत्पन्नस्य शम्भोः प्रसादधृतिकार्त्तयुगस्य वाकाटक
वंशालङ्कारभूतस्य महाराजश्रीप्रवरसेनस्य वचनात् धर्म्म
कार्य्यरतागे प्रवर्द्धमानराज्यसंवत्सरे अष्टादशमे फाल्गु
नमासकाद्दाद्श्याम् मौद्गल्यसगोत्राय तैत्तिरीयायाद्धर्य्य
वे देवशर्म्माचार्य्यायोदकपूर्व्वम् एकैरठः सपण्यतकः
ब्रह्मपुरकग्रामप्रामो विद्धद्रः वटपुरकस्योत्तरेण किनौद्धिवा
टकस्यापरेण पवरज्जवाडकस्य दक्षिणेन कोशपुरकस्य

पूर्व्वेण ससीमापरिच्छेदेन करञ्जाविरकतटे अथास्मत्सामन्तकाः
सर्व्वाध्यक्षानियोगनियुक्ताः आज्ञासञ्चारिकुलपुत्राधिकृताः भटा
श्छात्राश्च विश्रुतपूर्व्वया आज्ञया आज्ञापयितव्याः विदित
मस्तु वः यथैषोस्माभिः आत्मनोधर्म्मायुर्ब्बलविजयैश्वर्य्यविवृद्धये
इहामुत्र हितार्थमात्मानुग्रहाय वैजयिके धर्म्मस्थाने अभट
च्छत्रप्रावेश्यः अपारम्परगोबलिवर्द्दः अपुष्पक्षीरसन्दोहश्चचा
रासनचर्म्माङ्गारः अलिव क्लिन्नक्रेराधनतः स्थवु विष्टिपरिहार
परिहृतः सनिधिः सोपनिधिः सक्लिप्तोपक्लिप्तः आचन्द्रादित्य
कालीयः पुत्रपौत्रानुगामी भुञ्जमानो न केनचिद्व्याघातयि
तव्यः सर्व्वक्रियाभिः स रक्षितव्यः परिवर्द्धयितव्यश्च यश्चास्म
च्छासनमगणयमानः स्वल्पमपि परिहृतं कुर्य्यात्कारयेत वा
तस्य ब्राह्मणैरावेदितस्य सदण्डनिग्रहं कुर्य्याम कारयेम चेति
सेनापतौ नाप्यदेवे लिखितमाचार्य्येण ॥ अस्मिंश्च धर्म्माधिकरणे
अतीतानेकराजदत्तानु चिन्तनपरिपालनकृतपु
ण्यानुत्कीर्त्तयामः वर्त्स्यत्कालप्रभविष्णून् गौरवाद्भविष्यान्वि
ज्ञापयामः ॥ व्यासगीतौ चात्र श्लोकौ प्रमाणीकर्त्तव्यौ
षष्टिवर्षसहस्राणि स्वर्गे मोदति भूमिदः । आक्षेप्ता चानुमन्ता
च तान्येव नरके वसेत् ॥ स्वदत्ताम्परदत्तांवा यो हरे
त वसुन्धराम् । गवां शतसहस्रस्य हन्तुर्हरति दुष्कृतमिति ॥

Translation.

Of the seal. The irresistible edict *(sásanam)* of the illustrious prince of hereditary lineage, the ornament of *Vákáṭaka,* Rája PRAVARA SENA.

*Of the copper plates. Drishtamasi nama**. The illustrious Mahárája PRAVARA SENA of the race of VISHNU-RUDRA the rishi, performer of the several sacrifices of *Agnishtoma, Aptoryamekta, Shoṛasyatirátra, Vájapè, Vrishpati, Sadyaskra,* and the *Chaturasvamèdha,* ruled over the entire (province of) *Vákáṭaka.* In his place (succeeded) the superlative lord, devoted to Bhaírava—happy in being the vehicle of the moon-like† Siva-linga,—the great king of *Vákáṭaka,* Srí RUDRA SENA, grandson of GOTAMI', the daughter of the great king BHAVANA'GA‡ who was descended from a race of conquerors entitled to be inaugurated with the unsullied water of *Bhagirathi,* (the Ganges,) and who had bathed in the sanctified water of the *Dasasvamèdha* sacrifice,—the Bharasiva race. To him succeeded the diligent worshipper of MAHESVARA§, the just, upright, benevolent, brave, heroic, moral, humble, high-minded, strict in religious observances, victorious through faith, of a soul free from blemish,—endowed with all these virtues;—(who was) blessed with a century's store of treasures, of the benefits of civil polity, of warlike armament, of children and grand-children—who was as celebrated as Yudhisthira, the great prince of *Vákáṭaka*, Sri Prithivi Sena. To whom succeeded, the protected of the discus-holding divinity*,—the most opulent Mahárája of *Vákáṭaka* Sri Rudra Sena:—who was followed by the son of Prabhavati' Gupta', the daughter of the conformer to ancestorial customs—the upright conqueror of his enemies—The great king of kings Sri Deva Gupta,—the protected of Siva,—possessing the firmness of the Rájas of the *Satya yuga*,—surpassing all of the race of *Vákáṭaka* princes, Mahárája Sri Pravara Sena; whose edict is (as follows)—

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* This might possibly be an invocation in the usual form, but no divinity of the name of *Drishtamasi,* of which the letters are quite distinct, is known.

† White. The epithet signifies a devoted worshipper of *Siva.*

‡ Or Bhavanátha? § Siva.

Ernnu Káryyaratáge†...in the 18th year of his reign‡? on the 12th day of the light half of the month of *Phalguna*,—to Deva Sarma'cha'rya, chanter of the Sáma véda, of the *Modgula* tribe, and *Taitriya* sect, is granted with the ceremonies of sprinkling Ganges water, *Kérutu* (?) and distribution of 100 *pans*,—the village of *Brahmapura*, situated to the north of *Vatapura*, to the west of *Kinauhi-vátak* to the south of *Pavarajjavatak*, and to the east of *Kollapur*; demarked by these several boundaries, and seated on the banks of *Karanja* rivulet (?)

Be it known to all our subjects, our functionaries, and agents, to all obedient ryots now and hereafter, soldiery, spies §—That with the usual intent of such grants, for the increase of our virtue, life, power, wealth, and prosperity, here and hereafter, as well as for the divine favor; in the holy district recently conquered by us, (the said village is bestowed) free from military-billeting¶(?)—where the rája's deer and cattle shall not graze**—not subject to provide flowers and milk††. Where shall be neither spy, nor royal-chair, nor magazine ‡‡.................. §§? in which the inhabitants shall not be liable to *bègár* or forced labour;—along with its buried treasures and such like:—and with all its stock and the like;—as long as the sun and moon shall endure, to be enjoyed by him, his sons and descendants. Let none prevent or oppose; but defend (his possession)—and let him enjoy all increase by cultivation. Whoever shall disobey this order, or make encroachment or abstraction by himself or through others, shall be liable to fine or punishment before the judicial authorities.

Written by the pandit of the general Bappa Deva in this court of justice (*Dharmadhikaranè*). Whatever pious fame has accrued to princes of yore from similar acts should be remembered, and those who come hereafter should uphold them—(?). The holy Vyas has the following two verses to this effect:—

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* Vishnu. † The sense of this passage is obscure—one pandit by alteration to सूर्य्योपरागे would make it express "at a solar eclipse"—a common period for dating similar documents.

‡ *Pravarddhamán rajya Samvat ?* § *Bhartas'chhánráscha.*

¶ *Avatacchatraprávèsya*—all the succeeding epithets laudatory of the jagir are equally far-fetched and obscure.

** *Apárampáragobalivarddah.* †† *Apashpakshirasandoha.*

‡‡ *Achárásanavarmangara* (for *ágára*). It was customary with rájas to keep an *A'san* or throne, a spy and armour at each village.

§§ *Alivanatlinvakrenidhanatra ? Sarvavishti- parihara parihrita ?*

"He who bestoweth land on brahmans shall enjoy 60000 years' happiness in heaven; and he who resumeth it shall abide an equal term in hell. If he take away either by himself or by others, his sin is equal to that of the slaughter of a hundred thousand cows."

Inscription No. 6, of the Asiatic Society's Museum.

I have inserted this inscription in my series because it possesses an exact date, and because the original was not given in facsimile by Mr. Colebrooke when he transcribed its contents in his notice of various inscriptions in the ninth vol. of the Researches, page 433. There are, moreover, several letters misread in that copy from an imperfect acquaintance with the changes they have undergone in the course of ages: of these the *bh* is the most prominent, being taken from an *s**. The *Sárnáth* inscriptions of the same century have taught us its real value.

Still with these emendations the context hardly bears complete explanation, though the general object is clear. It states that in *Samvat* 1093 (A. D. 1035) on the 1st of the light half of *Asárh*, the paramount sovereign Yaso Pála of *Kàte* at the village of *Payahása* in the kingdom of *Kausambhí* (or *Delhi*) issues commands to the principal persons.... The following is the transcript as recompared with the original on the stone.

संवत् १०९३ आषाढ सुदि १

अद्येह श्रीमत्कटे महाराजाधिराजश्रीयशःपालःकोशाम्बमण्डले पयहासग्रामे महाम्म मनुसमादिशति यथापभोषेकौयमाथुरविक्षय्य शासनत्वं प्रसादीकृत्य मलभाग भोगाकरहिरण्यपत्यदायादिकं मह्वोपनतयामिति दसवम्वेन सहयिकं डालहनं पोचाचांभ........दं

Inscriptions from Chunar.

The two fragments inserted in Plates XXXI. and XXXIII. were presented by Capt. Cunningham, along with the stone in more perfect preservation published in a former plate. All that can be said of either is, that as the name of Swa'mi-ra'ja appears on one, they probably relate to similar objects described by the larger one, viz. the repairs of public buildings in the fort of Chunar.

The *Buddha gaya* inscription of Plate XXXIII. was alluded to in my last notice.

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* The *s* of this character enabled me to read some Ceylon coins of the same century.

VI.—*Some remarks on the development of Pollen. By* WILLIAM GRIFFITH, *Assistant Surgeon, Madras Establishment.*

Pollen of *Pardanthus Chinensis*, KER. Nat. Order *Irideæ.*

At the earliest period submitted to examination, and when the perianth scarcely exceeds half a line in length, the anthers are sessile and nearly perfectly formed. The cells, of which (as is perhaps the case in all bilocular anthers) there are four, contain a solid grumous semi-opaque mass, which is easily detached from the cell by slight pressure. This mass under a lens whose focal distance is one-twentieth of an inch, shews evident traces of cellularity, but the outlines of the cells are very faint. They are entirely filled with exceedingly minute granular matter. At a somewhat later period the cellularity of the mass is more obvious, but no separation of the component parts has taken place, and the cells are still entirely occupied by the granular matter.

When the perianth has attained the length of a line and a half, the mass will be found to have become externally of an orange colour, and traces of a proper enclosing membrane, the cells of which are extremely indistinctly marked, are now visible. The membrane appears to have no connection with the interior of the loculus. The cells composing the mass have undergone some separation. They consist of a hyaline membrane which appears to be of some thickness; it is generally of a globular form, but often attenuate at one or both ends. The granular molecular matter which originally filled the whole cavity of the cell, now occupies a portion only, and never appears to lose its spherical form. When the perianth is two lines long, the proper membrane of the mass has become more distinct ; its cells contain a good deal of granular matter of a reddish orange colour. The cells of the mass have become more separated, but have otherwise undergone no change; the semi-opaque nucleus presents traces of division most frequently into four, often into three, and very rarely into two portions. The division is more distinct towards the circumference of each cell; it may be observed in the same mass in every stage, from the commencement of the dividing lines to their meeting in the centre. The smaller masses or nucelli resulting from this division are each enclosed in a proper cell, but as yet have undergone no separation.

In the next stage the perianth had increased two-thirds of a line in length; the mass presented externally the same appearance. The component cells had increased in size, and the divisions of the nucleus had in many cases undergone complete separation from each other, and in all were separable by slight pressure. Each of these divisions is at this period a young grain of Pollen. On making their escape they leave their proper cells attached to the interior of the parent cell, which is hence divided into as many cells as there are divisions of the nucleus. The young grains are oblong-ovate, flattened on their contiguous or inner faces, and open along the centre throughout the whole length of their outer faces. They are even at this period reticulate, and have rather a papillose appearance; they are lined by an inner membrane in the form of a hyaline sac which bulges out slightly along the opening just mentioned.

When the perianth is three lines long, the grains of Pollen have undergone complete separation ; no traces of their original envelopes being visible. They vary much in size, are rather opaque, minutely reticulate, and marked along one side by a longitudinal semi-transparent line, which indicates the situation of the original opening, now closed up by the inflection of its edges. Immersion in water produces scarcely any action on them. At a later period, the perianth measuring five lines in length, the grains are considerably increased in size. Immersion in water causes the inflected margins of the furrow to secede, until they become widely separate. Through this the inner membrane bulges out to a considerable extent.

Perianth about six lines in length: the Pollen is now perfectly formed; the grains vary much in size, the smaller being probably abortive, but theya ll undergo the same changes on immersion in water. This causes the outer coat to be pushed back by the expansion of the inner, which is now nearly filled with minute granular matter.

At the time of dehiscence of the anthers the grains vary much in size: the more perfect are lanceolate in outline, of an orange colour, distinctly reticulate or cellular, and open on one side along the centre. This, however, is perhaps to be attributed to the excessive moisture of the climate. Immersion in water causes the very rapid bulging out of the inner membrane, which pushes back, and at length nearly entirely off, the outer one. This is filled with minute granular matter, the fovilla and burst of the immersion is somewhat protracted.

Stigmatic action causes the production of a tube or boyau from the inner membrane, the head of which tube continues to be covered partially by the outer coat.

This instance is interesting as an example of the development of Pollen by the division of an originally simple nucleus and of perfect and almost spontaneous separation of the outer coat, and lastly as pointing out clearly the nature of the longitudinal furrows of such common occurrence in the ordinary forms of Pollen.

In the two other instances which I have selected as demonstrations, the steps are much the same. Care must be taken not to confound the appearance presented by the Pollen of *Luffa fœtida* at a late period of its development, and which evidently arises from the strong inflection of the outer membrane, with that occasioned by the much earlier dividing process.

In *Hedychium* I have been unable to examine the development at a sufficiently early period, but it appears to me the divisions of the original or parent cell form the outer coats of the subsequent grains of Pollen: this is certainly not usually the case. The Pollen of this plant is remarkably simple, for it is neither provided with furrows nor apparent pores.

The inner coat,—for I am disposed to believe that it has one,—adheres strongly to the outer, and none of the ordinary means are sufficient to ensure its separation.

As I have, since a portion of the above was written, received numbers of the Annales des Sciences Naturelles for March and April 1835, in which occur extracts of considerable length from the writings of Mr. Hugo Mohl, who has published lately (1834) at full length on this important organ, it may not be amiss here to state the principal results to which this botanist has arrived; noticing, however, only those which relate to development and structure.

After pointing out that in by far the greater number of cases, the inner membrane, which contains the fovilla, is enclosed in a second membrane, M. Mohl proceeds to a detailed account of the outer membrane. This is represented as being always finer than the inner, and as generally determining the form of the grain; and that it is to the liquid secreted by it that the colour and viscosity of the grain is to be attributed.

The punctuation which frequently exist in this membrane are supposed to be rudimentary cellules; hence the comparison of this coat to a simple cellule is altogether inexact; it should be considered as an organ composed of cellules or the rudiment of cellules, and a homogeneous uniting membrane, and hence it should be compared with compound membranes; such, for instance, as those of the ovule.

It is only in a small number of plants that this coat presents the form of a perfectly closed, continuous, sphærical sac; in most cases it is either furnished with folds or pores, or both.

Up to the period of M. Mohl's publication nothing whatever was known of the nature, functions, or number of these folds; most botanists, so far at least as may be judged of from their descriptions, considering them to be solitary. M. Mohl remarks, that in monocotyledones they are generally single, but that in dicotyledones the number is generally increased, and occasionally exceeds twenty. The portion that is folded in has always a different structure from the remainder, and is generally smooth and transparent; and it rarely ever happens that in cellular Pollen the inflected portion is itself cellular. He supposes that in all cases the outer membrane forms a perfectly closed sac, although in some Pollen the inflected portion has more of a gelatinous than a membranous consistence, and is ruptured by immersion in water. The apparent pores visible in the Pollen of many plants, M. Mohl states to be in all cases covered over by a thin membrane—to the existence of this membrane over the larger pores he speaks positively. In those cases in which the membrane covering the pore separates in the form of an operculum, it is attenuated alone along the margin of function or continuation with the remainder of the outer coat. These statements accord with the author's views of the nature of the supposed pores of cellular tissue; views, however, which have not been generally received, and which in the case of cellular tissue are open to weighty objections. The inner membrane is represented as always having the same structure; it is always completely homogeneous, very thin, and hyaline, and always exists as a shut sac. It is particularly remarkable for the facility with which it absorbs water; this M. Mohl looks upon as a physical action and as attributable to endosmosis.

The production of tubes (boyaux) by immersion in water, (and which are prolongations in all cases, except perhaps in *Coniferæ*, of the immediate covering of the fovilla) never takes place in those Pollens, the outer membrane of which is perfectly closed, or the folds or furrows of which are unprovided with pores. But in every Pollen they are produced by stigmatic action. The action likewise exerted on the grains by this portion of the female organ is more energetic than that of water, producing twelve or fifteen times the diameter of the grain; while the longest, M. Mohl observed, produced by the action of water only exceeded the grain in length once, or once and a half.

I may here state, that M. Mohl has understated the length of the tubes arising from stigmatic action. The length will depend upon the distance between the part of the stigma to which the grains are applied and the foramen of the ovulum to which they have to be applied. Thus, for example, in Zea mays, the length of the tubes must be enormous, since the style itself is about a span long. It may be objected, that there is no proof of the universal necessity of the application of the tube to the foramen, or that portion of the ovulum corresponding to this. Still there is ample proof of this necessity in Asclepiadeæ; and, as I have observed it in *Solaneæ, Gentianeæ, Nelumboreæ,* and *Leguminosæ,* I have no doubt that the application of the tube to the foramen is absolutely necessary to insure fecundation. And with regard to the length produced by the action of water, I have seen tubes produced from the grains of Pollen in a species of *Impatiens,* I believe the *Impatiens tripetata* of Roxburgh, exceeding six or eight times the long diameter of the grain; these tubes, however, never even after protracted immersion contained any granules. Their growth in the above instance may be actually watched, the apex of the tube creeping along with an excessively slow vermicular motion.

M. Mohl states, that *Asclepiadeæ* alone have no outer membrane. The existence of this membrane as a distinct integument has been proved by Mr. Brown; although in almost all the species of this family, the outer coats are in a state of mutual adhesion*.

Coniferæ are said to have three coats; the intermediate one resembling the inner membrane of ordinary Pollen, especially in its great extensibility; in this property the innermost, although it has the ordinary structure of inner membranes of other Pollens, is deficient.

As I have mentioned before, this author considers the outer membrane as the secretory one, and he denies the possession of secretory powers by the papillæ; an opinion stated to be advanced by Mr. Brown. M. Mohl proves that the secretion of oil is not limited to any papillosity of surface; of this *Pardanthus Chinensis* is an instance.

This botanist doubts the proper activity of the molecules or granules contained in the fovilla, and he adduces the authority of M. Fraunhofer as to the utter impossibility of preventing currents in liquids.

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* I find that the cells of the anther of *Oxystelma esculentum* are at an extremely early period lined by a free *simple* sac containing irregular masses of opaque granular matter; soon after, this cell appears to be filled entirely with the granular matter, by which it is rendered somewhat turgid. In this state it is detachable with extreme difficulty. When the flower-bud is two lines long, the mass has become cellular, and the granular matter correspondingly subdivided. The subsequent changes consist merely in the increase of size and consistency of the parts, and perhaps in the development of the inner membrane. We may hence be allowed to infer that the mass, from which all Pollen grains seem to be developed, is in *Asclepiadeæ* reduced to a single cell: and that the grains are produced by its indefinite division. The only material objection to this view exists in the original cell itself entering into the composition of the grains of Pollen; and in its not disappearing, as appears to be generally the case.

Still I conceive it impossible to doubt the inherent mobility of these granules. In some oily Pollens granules may be observed by the sides of excessively minute drops of oil, certainly not exceeding the larger granules twice in diameter; and yet the granules will be seen in active motion, and the oil perfectly stationary. M. Mohl contradicts positively the curious fact advanced by M. Adolphe Brongniart, that the granules are in some plants of the same size. Of this I certainly have never met with an instance. He likewise doubts the curvature of some molecules; but as Mr. Brown and M. Brongniart speak positively on this point, I should prefer adopting their testimony.

It is, likewise, said, that the idea of the granules nourishing the tubes is untenable, and founded only on conjectures. But as it invariably happens that the longer the tube is the fewer the granules are, this opinion, which was I believe first indicated by the highest of all authorities, Mr. Brown, cannot be said to be destitute of foundation.

With regard to the development of Pollen, M. Mohl states that his observations entirely confirm those of M. Brongniart, and that the Pollen is formed from the granular matter contained in the cells of the parenchymatous mass, which exists in each cell of the anther. But although M. Brongniart certainly appears to have been the first to have observed the formation of pollen by division, yet his account in his "Memoire sur la generation et le developpement de l'embryon dans les vegetaux phanerogames," is certainly not characterised by that precision which exists in the account of the development of the Pollen in *Tradescantia virginica* by Mr. Brown, and subsequently in that of *Cucurbita Pepo* by M. Mirbel.

This latter, indeed, was the first instance examined by M. Brongniart, who states that what are now known to be lines of division result from pressure. It still remains to be proved whether in any instance the formation takes place, as M. Brongniart says it does, in *Cucurbita Pepo,* by the cellules of the mass contained in the cavities of the anthers becoming directly grains of pollen. M. Mohl mentions many instances in which the quaternary division is resorted to; it is owing to the continuance of the original adhesion that the pollen of many plants is compound. The number, however, is not in every case thus limited: the generality of the species of *Mimosa, Acacia, Inga,* have pollen composed of sixteen cellules. But on the development of these no direct observations have as yet been given. The number of masses into which the originally simple nucleus may be divided, is almost as frequently three as four. Of the binary composition of the mature Pollen *Podostemon* affords the only instance as yet known to me, but this may obviously arise as well from a quaternary as a binary division of the nucleus.

M. Mohl rejects very properly as highly improbable the opinion of M. Brongniart, that the granules of the fovilla are secreted by some part of the inner surface of the cells of the anther, and that they reach their destination, the cavity of the inner membrane of each grain, by absorption. It must, however, be remembered that M. Brongniart alludes to this mode of formation and transmission with considerable doubt.

Lastly, M. Mohl notices the extreme similarity between the formation of the pollen and that of the sporules of the more developed *Cryptogamia*. I am not aware who first pointed out this curious analogy, which cannot well have escaped any one who has examined both formations at a sufficiently early period. My first knowledge of it is due to M. Mirbel, who pointed it out to me early in 1832*.

Explanation of the figures, Plate XLI.

1. Portion of a mass extracted from a loculus; perianth 1 line in length.
2. Ditto ditto; perianth 1½ line in length.
3. Three of the component cells of a mass; perianth 1⅝ line long.
4. Four similar cells more developed; perianth about 2 lines long.
5. Portion of a mass enveloped in its membrane, extracted from the cell of an anther; perianth 2 lines in length.

5*a*. Two of the component cells detached.

6. Four of the cells detached: (perianth 2⅜ lines long:) viewed in different aspects:—from one, three nuclei have escaped, and the fourth is half exserted.

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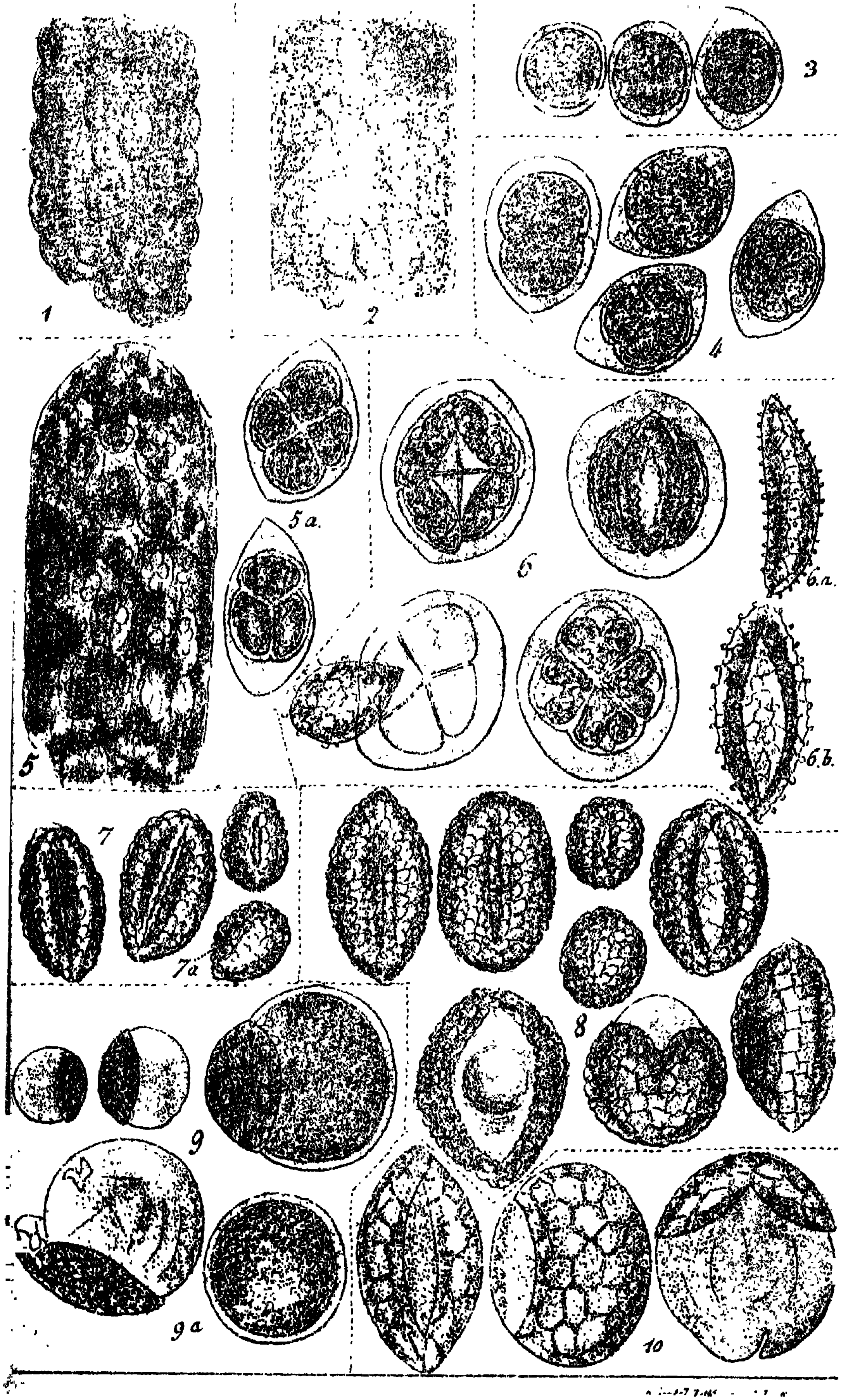
* *Equisetaceæ* do not, as might be supposed from their late elevation into an order of *Gymnospermæ*, differ from the higher forms of *Cryptogamia* in the development of their sporula. The spiral fibres, as might be expected, are of comparatively late appearance, and they are developed on or in a loose membranous coat, no traces of which are to be found until the sporula have assumed their proper form. The fibres subsequently, and about the time of the development of the fibres of the cells of the inner parietes of the capsules, become free, the membrane to which they were attached remaining as an envelope to the sporule, from which it subsequently becomes separable with facility. The granules are of still later appearance.

To the correctness of the chief portions of the above statement I can speak with tolerable confidence, but I only infer that the hyaline envelope of the perfect sporule is the mature state of the tunic, to which the spiral fibres are originally attached.

There would hence appear to be no foundation whatever for the adoption of the idea of the sexuality of *Equisetaceæ*,—an idea very likely to meet with advocates from its extreme ingenuity. The analogy of the fibres or supposed filaments is to be looked for in the elaters, and of the tunic or envelope in the tunic of the sporules of many *Hepaticæ*.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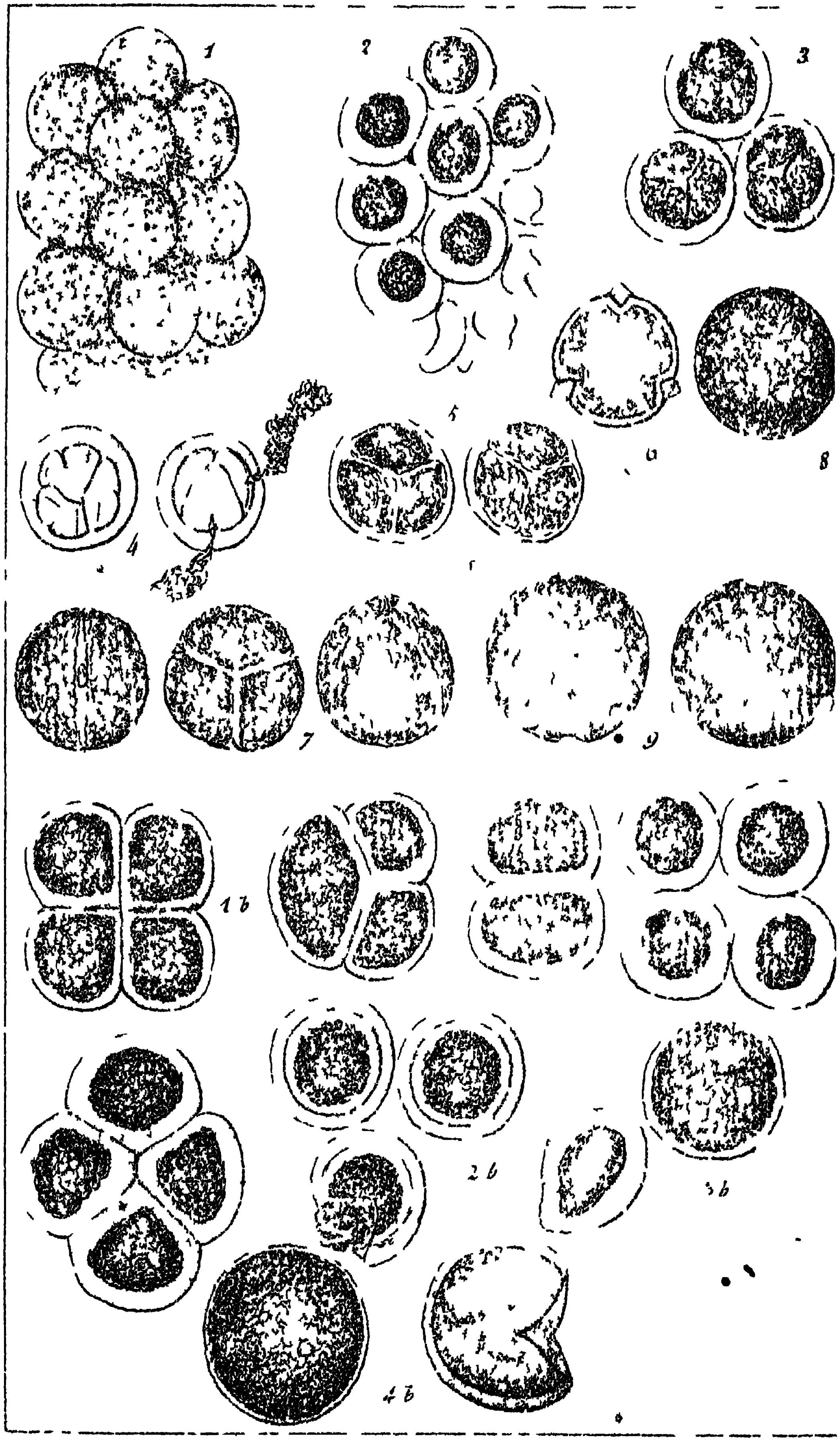


Oriental Lith^c Press Calcutta

6*a*. Lateral view of the nuclei or young grains of Pollen.

6*b*. Vertical view of ditto on its outer face.

7. Pollen immature: the perianth being 3 lines in length.

7*a*. Represents what was the inner face prior to the escape of the nucleus from the cell.

8. Pollen viewed variously; perianth 5 lines in length, shewing the various degrees of expansion of the fissure according to the length of immersion.

9. Pollen: perianth 6¼ lines long. 9*a*. Inner membrane escape.

10. Perfect Pollen. 10*a*. Grain viewed as an opaque object.

Plate XLII. A.

Pollen of *Luffa fœtida.*

1. Portion of a mass extracted from one of the cells of an anther: flower-bud one and half line long.

2. Portion of a mass more advanced: the component cells adhering together firmly. Flower-bud about two lines long.

3. Cells of a mass more advanced: they cohere very slightly. Perianth two and half lines long.

4. The same submitted to slight pressure, shewing that each nucellus is contained in a separate cell.

5. Cells more advanced.

6. Pollen perfectly formed, but destitute of granules. Flower-bud about three and half lines long.

7. Three grains of Pollen considerably more developed; in the centre of each fold there exists a pore. Flower-bud four lines long.

8. Pollen: the folds have disappeared. Flower-bud five lines long.

9. Perfect Pollen.

All more or less magnified, and all examined in water.

Plate XLII. B.

Pollen of a species of *Hedychium.*

Fig. 1. Five *original* cells in various states of composition and cohesion. Perianth three lines long.

2. Grains of Pollen resulting from the complete separation of the above: an inner disc is visible at this period. One grain has burst by pressure.

3. Two grains of Pollen, one abortive. Perianth one inch long.

4. Perfect Pollen: one grain ruptured by pressure.

All more or less magnified, and all viewed in water.

VII.—*Sub-Himálayan Fossil Remains of the Dádúpur Collection. By Lieuts.* W. E. Baker *and* H. M. Durand, *Engineers.*

QUADRUMANA.

Lyell, when combating the inconclusive evidence advanced in support of the theory of the progressive development of organic life, notices the absence of remains of quadrumanous species in a fossil state, and the hypothesis which this circumstance has by some geologists been considered to countenance. He, however, draws attention to the fact, that the animals which are found in sub-aqueous deposits, are in general such as frequent marshes, rivers, or the borders of lakes, and that such as live in trees are very rarely discovered; he adds, moreover, that considerable progress must be made in ascertaining the contemporary pachydermata before it can be anticipated that skeletons of the quadrumanous tribes should occur. Considering the great number of relics assignable to the *Pachydermata, Ruminantia,* and *Feræ,* which the Sub-Himálayan field has produced, it is not therefore surprising that at length the half jaw of a quadrumanous animal should be brought to light: the circumstance, however, being interesting in several respects, we have not deferred its communication until further research should put us in possession of more perfect specimens; the chances are against the probability of more being brought in for some time—in the interval it may be as well at once to add to the Sub-Himálayan list of fossils one species belonging to the order of the quadrumana.

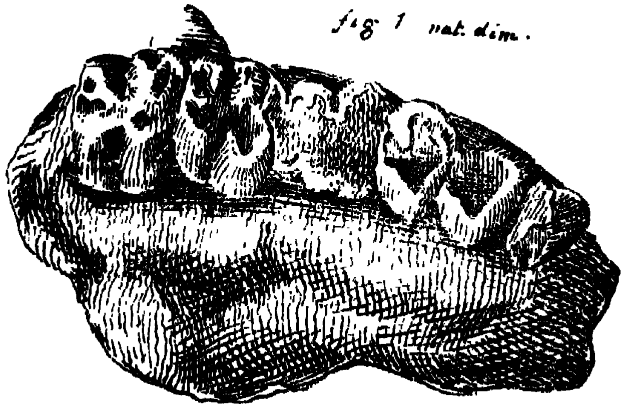
The specimen in question was found in the hills near to the Sutlej, and it appears from the attached matrix to have been derived from a stratum very similar in composition to the one described as occurring at the Maginund deposit. The fragment consists of the right half of an upper jaw; the molars as to number are complete; but the first has lost some of its exterior enamel: and the fifth has likewise had a portion of the enamel from its hind side chipped off. The second and third molars are a good deal worn, and the state of the fourth and fifth such as to indicate that the animal was perfectly adult. The canine is small, but much mutilated, its insertion into the jaw and its section being all that is distinct.

From the inspection of the molar teeth, the order to which the animal belonged is sufficiently evident; but there is enough of the orbit remaining to afford additional and very satisfactory proof; the lower part of the orbit and the start of the zygomatic arch being very distinct, would alone remove all doubt from the subject; the orbits of the quadrumana being peculiar and not easily to be confounded with those of other animals.

On comparison with the delineations of the dentition of this order of animals given by F. Cuvier, the fossil bears some resemblance to the genus *Semnopithecus;* the section of the canine and the form and size of the false molars are very similar to the exemplar taken by F. Cuvier from a head of the species *Maurus,* a species found in Java: had the drawing been taken from the *Entellus,* a species which inhabits India, the comparison would in this instance have been more

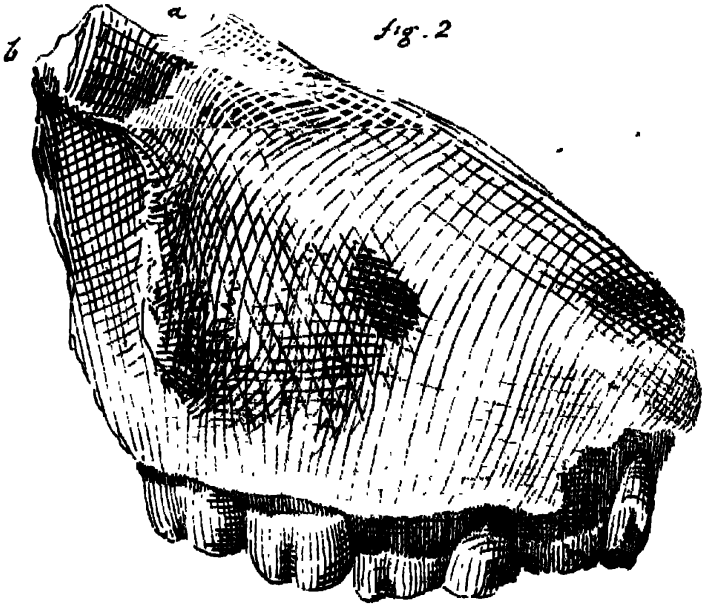
Sub Himalayan fossil Remains

fig 1 nat. dim.



Quadrumana

fig. 2



Baker del.

J. Prinsep lith.

satisfactory; the *Maurus* being chosen as the type, and no mention made of other difference except length of canines, the various species may be supposed to present no material departure from the type in form of molars. The third molar in the fossil is so much worn as not to admit of being compared with drawings from unworn teeth; the fourth is like that of the *Maurus*, but the fifth does not resemble the analogous molars of any of the existing species as represented by F. Cuvier, for the fossil tooth possesses a small interstitial point of enamel at the inner side, which does not appear to have place in any of those delineated. The incisors are absent, but the intermaxillary is clearly distinguishable.

Were it not for the size of the canine and the fifth molar, the specimen presents some resemblance to the genus *Macacus*, given as the type of the genera *Macacus* and *Cynocephalus;* the smallness of the canine and the large size of the molars causes the fossil to approach more nearly to the *Semnopithecus* than to the *Macacus;* the difference is, however, great between the two, for the *Entellus* is said to attain the length of three and a half feet, whereas the length of the fossil animal, if the space occupied by the molars and their size be deemed sufficient ground for a conjecture, must have been equal to that of the *Pithecus Satyrus*—the space taken up by the molars is 2.15 inches. This circumstance, and the differences before pointed out, clearly separate the fossil from the species belonging to the genera *Cynocephalus* or *Semnopithecus*. The specimen is imperfect, but it indicates the existence of a gigantic species of Quadrumanous animals contemporaneously with the Pachyderma of the Sub-Himálayas, and thus supplies what has hitherto been a desideratum in Palæontology—proof of the existence, in a fossil state, of the type of organization most nearly resembling that of man.

Note.—Fig. 2 in the Plate is a little foreshortened in order to show the bottom of the orbit at *a*, which in an accurate profile view is hidden by the ascending part of the orbit, the section of which is seen at *b*.

Both figures were taken with the camera lucida.

VIII.—*Descriptive Catalogue of a collection of Land and Fresh-water Shells, chiefly contained in the Museum of the Asiatic Society. By* W. H. Benson, *Esq. B. C. S.*

Part 2.—Fluviatile Shells.

(Continued from page 358.)

19. *Planorbis umbilicalis.* Testa quasi dextrâ luteo-corneâ, politâ, leviter radiato-striatâ, infrà excavato-depressâ, anfractibus omnibus versus umbilicum profundum spectantibus, ultimo interiores penè

tegente; suprà convexâ, versùs apicem planatâ, apice concavo, omnibus anfractibus satis apparentibus: peripheriâ obtusè angulatâ. Diam. 0.3 poll.

This shell, belonging to the same division of Planorbis as the British species *Pl. fontanus*, *(Pl. nitidus*, LAMARCK,) in which the whorls on the inferior side are nearly covered by the succeeding ones, may easily be distinguished from that species, which it resembles also in colour, by the greater convexity of the last whorl towards the periphery, and by the slope towards the penultimate whorl, on the under side; while in *Pl. fontanus* the convexity is next to the penultimate whorl, and the slope tends towards the circumference. The disposition observed in *Pl. umbilicalis* occasions a great concavity on the under side of the shell. The superior margin of the aperture, as in most of the depressed Planorbes, projects much behind the inferior margin, occasioning a great obliquity from the plane of the axis. The North American species *Pl. deflexus* and *Pl. exacuens* of SAY, more especially the latter, have an affinity to this shell, which is probably an inhabitant of the streams of *Silhet.*

20. *Planorbis trochoideus.* Testâ quasi dextrâ diaphanâ, subtrochiformi, suprà glabrâ, rotundato-convexâ, apice concavo-depresso quasi umbilicali; anfractibus omnibus parùm apparentibus, saturâ excavatâ divisis; infrà radiatim striatâ, truncatâ, planatâ, umbilico contracto. Anfractu ultimo majori reliquos amplectente, suprà penè, infrà omninò obtegente; peripheriâ acutâ.

The last whorl altogether conceals the other whorls on the lower face of the shell, leaving merely a contracted umbilicus in the centre, towards which the flattened surface declines. On the upper side only a small portion of the depressed spire is shewn, the whorls being rather compactly wound. The species differs from all others hitherto described in the singular truncated form of the inferior surface, and in the circumstance of the last whorl winding closely round the axis, as in many Helices and Trochi, without the intervention of the preceding whorls, none of which are visible in the very contracted umbilicus. The only shell of the genus which bears any very near resemblance to it in the formation of the under side, is *Pl. fontanus* of British authors, *(Pl. nitidus* of LAMARCK,) the umbilicus of which is unusually contracted when compared with other species of the genus, but still exhibits within its vortex the whole of the preceding whorls, and so does not deviate from the recorded generic character; while the species now brought to notice renders nugatory, as far as it is concerned, two important characters of Planorbis, viz. "anfractibus omnibus utrinque conspicuis," and "aperturâ ab axe remotissimâ." For the present, considering that a similar variation of character in Trochus and Helix has not prevailed to separate species from those genera, I have not thought it necessary to detach *Pl. trochoideus* from Planorbis, but am inclined to consider it as one of the terminal species; merely prefixing to each of the characters above quoted the word "crebriùs."

As this form does not belong to the *Silhet* collection, and is an inhabitant of the neighbourhood of *Calcutta*, I intended to have included it in a paper on some other new Bengal species; but as it is desirable, in consideration of its interesting and anomalous structure, that its publication should not be delayed until I can devote leisure to their description, I seize the present opportunity for making it known.

The only specimens met with were taken by me, in August 1835, in the gardens of *Barrackpur* Park, near a tank, on the margin of which are some artificial ruins. They inhabited large earthen vessels filled with water, containing aquatic plants, and adhered to the prone surfaces of the floating leaves in company with a small Planorbis*, and a small lengthened Lymnæa which approaches in its characters to *L. chlamys* of this catalogue.

21. *Planorbis compressus*, Hutton, J. A. S. vol. iii. p. 91, No. 12.

The *Silhet* specimens scarcely differ from weathered individuals of Lieut. Hutton's shell, in which the extremely delicate carina, which margins the angular periphery in perfectly fresh specimens, is more usually found to be obliterated. The depressed whorls are equally visible on each side, and are highly polished in recent examples. They occur in great perfection near *Banáras*, adhering to the floating foliage of Trapa natans, and occasionally swimming at large on the surface of jhíls. This is the species alluded to by me as *Planorbis B.* in page 264, vol, i. *Gleanings in Science*, and figured as No. 10, Plate VIII.

22. *Planorbis Indicus*. Pl. corneus? Hutton, J. A. S. vol. iii. p. 90, and Benson, Gleanings in Science, page 264, Plate VIII. fig. 6.

Testâ discoidea, albidâ vel corneâ, supernè plano, suturis excavatis, umbilico depresso; subtùs planato-depressâ, latè umbilicatâ; anfractibus ventricosis transversè profundè et eleganter striatis ætate varicibus munitis. Aperturâ rotundatâ, auriformi, minimè obliquâ.

Pl. Indicus is scattered over the whole of the Gangetic provinces, and scarcely a pool of water can be found destitute of it. The *Silhet* specimens prove to be a small corneous variety occasionally to be met with to the westward. In some waters the species attains a great size, being 0.9 of an inch in diameter, and nearly equalling in magnitude *Pl. corneus*, which it resembles in general appearance, but from which it will be found to differ in the depth and regularity of the striæ, in the comparatively less profound excavation of the sutures on the upper side, and less profoundly sunk apex, as well as in being somewhat less ventricose. The animal is most commonly of a black olive colour, occasionally dark maroon red.

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* I omitted to take specimens of this shell, which is either *Pl. compressus* of Hutton, or a new Calcutta species, *Pl. nanus* mihi, which is very similar to the British species *Pl. albus*.

In the foregoing descriptions of Planorbis I have used the words upper and lower with reference to the faces of the disc which adjoin respectively the back and foot of the animal when creeping. The animal of Planorbis is undoubtedly sinistral, but if the shell be viewed as such practically, and placed with the side which would in a sinistral shell be accounted the apex uppermost, it will be found that the animal is on its back, and that it will have to twist its body half round in order to gain the ground with its foot; and that in order to creep with any ease, it must reverse the position of its shell. This will be more especially observable in the flatter and more oblique mouthed species. I propose, therefore, to consider that face as containing the apex, in discoid shells, which is contiguous to the back of the animal. This side may invariably be known in Planorbis by the greater projection of the lip in that part, by the deeper depression of the central umbilicus, and by the more considerable involution of the whorls occasioning a greater depth of suture.

Observers have, in general, adhered to no fixed rule on the subject, and have been guided chiefly by the aspect of the shell. TURTON's characters of *Pl. fontanus* and *Pl. contortus* afford an instance of the same side being considered the upper in one species, and the lower in another. LAMARCK was more consistent, and while he rightly viewed the shell as sinistral, called, in every species, that side of the shell which is contiguous to the back of the animal, the lower face. On the other hand, it is evident, from SAY's description of *Pl. deflexus* and *Pl. corpulentus*, and from his denominating those species dextral, that, in those shells at least, he has followed the contrary rule.

23. *Lymnæa chlamys*. Testâ translucente, corneâ aut castaneâ, elongato-ovatâ; spira gracili, breviore, acuminatâ; anfractu ultimo infrâ præcipuè ventricoso; suturis parcè depressis; aperturâ infrà patente, basi leviter evasâ.

The Lymnæa in the *Silhet* collection is the chestnut-coloured variety. The paler kind is met with in great perfection in *Lehtára* jhíl, near *Banáras*, in company with Planorbis compressus, and another fine Lymnæa which I designate as *Lymnæa Butta*. The *Silhet* shell has an eroded spire, and consequently wants the graceful appearance of the western variety. I at first described it as a distinct species, but a comparison with a good series from *Banáras*, where the species is very variable, has led to their reunion.

Lieutenant HUTTON has referred the species with a mark of doubt to *L. limosa*, which it in no wise resembles. In perfect specimens the spire occupies about one-fifth of the total length. Greatest length of the shell 1.4 inches.

24. *Paludina oxytropis.* Testâ tenui ovato-conicâ olivaceâ, decussatim striatâ; anfractibus supernè carinis plurimis fuscis ornatis, ultimi carinâ mediâ saliente subacutâ; infernè fasciis quibusdam elevatiusculis fuscis; suturis inconspicuis; apice acutâ; canali umbilicali excavato; aperturâ intùs violaceâ, peristomate acuto, nigro. Long. 1.7 poll. Lat. 1.3.

This is a very remarkable and elegant species. Some of the specimens are, I believe, much larger than the one described.

25. *Paludina Lecythis.* Testâ tenui, globoso-conicâ ampullaceâ, olivaceâ, glabrâ, rugis obsoletis decussatâ; spirâ obtusiusculâ; anfractibus valdè ventricosis, rotundatis; suturis excavatis; aperturâ intùs violaceâ spiram longitudine superante; peritremate nigro, subreflexo; umbilico evanescente.

The striæ of growth, or rather the indications of former lips, are very frequent and prominent near the back of the outer lip; the rest of the shell presents that facet-like appearance which is so remarkable in some Lymnææ. I was at first inclined to consider this shell to be GRAY's *Pal. Chinensis*, figured, but not described, in GRIFFITH's CUVIER; but our shell is much more ventricose, the sutures are more pronounced, and it is deficient in the angular appearance observable at the base of the aperture in the Chinese species. It is a very thin shell in proportion to its volume. The epidermis is greenish olive in young specimens, reddish fuscous in the adult. Long. 2 poll. Lat. 1.7.

25½. *Paludina Bengalensis*, LAMARCK. Idem. var. balteata, fasciis elevatiusculis.

26. *Paludina crassa*, HUTTON's MSS. and J. A. S. vol. iii. p. 90, No. 5.

Testâ ovato-conoideâ, ventricosâ, solidâ, pallidè virente, obsoletè fasciatâ, rugis exilissimis decussatâ; anfractibus tumidis, suturis excavatis; spirâ obtusâ; umbilico subcanaliculato; aperturâ intùs lactescente. Long. 1 poll.

This species varies in configuration even in the same waters, some specimens approaching to a subglobose form, while others have a more lengthened conoid spire. It is very abundant in the river *Gúmtí* at *Jónpur*, where it is paler, and has a more yellowish tinge than the *Silhet* variety, which, from having an eroded summit, appears to have inhabited stagnant water. It has a singular habit, for the genus, of burying itself in the mud or sand in shallow water, often in large societies; other species conceal themselves in the mud in the season of drought, but *P. crassa* does so from choice, and is impelled by no such necessity. The shell of the lately excluded young is so depressed and globular, that it might be easily mistaken for a young Ampullaria. The adult shell attains a degree of thickness unusual in the genus.

27. *Paludina pulchella.* Valvata, No. 9, Hutton, J. A. S. vol. iii. p. 90.

Testâ ovato-conicâ leviter striatâ, epidermide olivaceâ; anfractibus rotundatis, suturis depressis. Aperturæ peritremate nigrescente; umbilico arcto. Long. 0.3 poll.

Aperture occupying half the length of the shell.

28. *Ampullaria.* The specimens of this shell, which is common in Bengal, are much superior in size to any which I have met with west of the *Brahmaputra*. As I have reason to believe that the species is described, I shall content myself with this allusion to it. I should have considered it to be *A. fasciata* of Lamarck, were it not that that species is said to have a corneous operculum.

29. *Melania variabilis.* Testâ elongato-turritâ solidâ olivaceâ vel piceâ, sub epidermide albidâ; anfractibus convexis transversè liratis, longitudinaliter striatis et costatis; costulis anfractûs ultimi supernè nodulosis; apice plerumque truncato; suturis excavatis. Aperturâ intus violaceâ, columellæ basi sinuatâ.

Inhabits the river *Gúmtí* at *Jónpur*, and Tolly's nullah near *Calcutta*.

Var. A. Anfractuum inferiorum liris elevatis, nodulis elevatioribus. Inhabits river *Húghlí* at *Calcutta*.

Var. B. Liris, medianâ exceptâ, obsoletis; nodulis subspinosis carinam humeralem coronantibus.

Var. C. Lævis liris costulisque obsoletis, anfractûs ultimi medio subcarinato, adulti nodulis humeralibus frugaliter sparsis.

Var. D. Anfractuum superiorum costulis obsoletis, ultimi et penultimi liris transversis costulis longitudinalibusque supernè serie duplici nodulosis.

Varieties B, C, and D are in the *Silhet* collection. The type specimens of several of these varieties would, if viewed apart, be easily mistaken for distinct species, but they melt into each other so gradually, occasionally shewing the characters of more than one variety combined in the same shell, that no doubt remains of their blending in one species. In Tolly's Nullah I took larger specimens than any in the collection; though at least four twists of the spire were defective, one individual measured 3.4 inches in length. The *Gúmtí* specimens are less liable to truncation, and in young specimens the apices are nearly perfect. I have not observed more than 12 whorls present in any specimen. I described the type of the species without a name as species A* in the 13th No. of the *Gleanings in Science.* It was figured as No. 7, in Plate VII. vol. i.

30. *Melania Stephanus.* Testâ ovato-conicâ, gradatâ, plerumque deinde truncatâ globoso-ovatâ, olivaceâ anfractibus obsoletè fasciatis, transversè sulcatis, supernè planulatis, spiris brevibus validis coronatis; aperturâ albidâ subrotundatâ, supernè ferè angulatâ; labro subdenticulato.

This shell, which is very solid, approaches in form to *M. Amarula*, but differs from it in the configuration of the aperture, and in the comparative shortness of the whorls, as well as by the denticulations on the inner edge of the labrum. Among the numerous specimens which I had an opportunity of inspecting, only a single individual was perfect, and the greater number exhibited only two whorls, the remainder being truncated. This character I find to be an usual indication of habitation in stagnant water. The sulcations on the whorls are sometimes obsolete.

31. *Melania zonata.* Testâ ovato-conicâ, lævi, longitudinaliter striatâ, olivaceâ, zonis tribus brunneis fasciatâ; anfractibus leviter convexis, suturis minimè profundis; aperturâ albidâ ovato-oblongâ infrà subangulatâ. Long. 0.85 poll.

This a very distinct and pretty species, with a strong epidermis. It is generally eroded at the apex.

32. *Melania Terebra.* Testâ elongato-turritâ, olivaceo-brunneâ, lævi, politâ; anfractibus tumidis; suturis excavatis; sinu inter basin labri columellamque nullo. Long. 1.05. Testa truncata.

It is distinguished from the young of the smooth variety of *M. variabilis* by the want of angularity at the centre of the lower whorl, by its polished epidermis, more tumid whorls and more deeply sunk sutures, as well as by the absence of the sinuation of the inner lip which characterizes that species. The apex of the shell is more or less truncated.

33. *Melania conica*, Gray? Testâ solidâ, globoso-conicâ, longitudinaliter striatâ plerumque transversè obsoletè sulcatâ; anfractibus, ultimo ventricoso cæteris rapidè diminutis; suturis bene signatis; aperturâ

ovatâ, intùs albidâ, fasciis quibusdam castaneis ornatâ; labro intùs denticulato.

This species resembles so closely the figure given in GRIFFITH'S CUVIER, Pl. 14, f. 3, as *Melania conica* of GRAY, that I am unwilling to describe it as new, in the absence of a specific character of that shell. GRAY'S figure, however, does not exhibit the obsolete sulcations of the shell under review,—an omission which may be attributed to the brown incrustation with which they are ordinarily obscured, nor the smoothed denticulations which ornament the interior margin of the right lip in our shell. Should it eventually prove to be distinct, it may be named *M. denticulata* from this character, which is also possessed in a minor degree by *M. Stephanus*. The spire is eroded in all the specimens which I have examined. Length one inch.

34. *Neritina depressa.* Testâ solidâ, sub-convolutâ transversè ovatâ, gibbosâ, olivaceâ, longitudinaliter purpureo-fusco latè strigatâ, strigis versus apicem angulato-flexuosis; spirâ depressâ; anfractibus sub-binis; peritremate integro acuto, sub-orbiculari; septo calloso magno; aperturâ parvâ, lunatâ, aurantiâ; labio sub-recto, medio emarginato, ibi denticulato.

Greatest transverse diameter 0.8 inch. The peritreme which surrounds the aperture and shelving callus is nearly free, and occupies nearly the whole face of the shell. All within it, including the septum as well as the aperture, is usually of a dull orange colour. When *weathered* the shell is whitish, with pink bands and zig-zag lines; the denticulations of the inner lip are occasionally obsolete. The individuals in the Society's collection are probably from the *Sundarban* rivers, as the species is common, adhering to wooden piles and brick-work in the Húghlí at Calcutta, as well as in waters which have periodical communication with it. The following species is so nearly allied to *N. depressa* that I shall describe it here for the purpose of instituting a comparison and pointing out the distinctive characters, although no example of it occurs in the collection.

35. *Neritina cornucopia.* Testâ solidiusculâ, convolutâ, subsymmetricâ, transversè ovato-acutâ, gibbosâ, pallide virente, punctis minimis nigris, interdum confluentibus, lineis longitudinalibus dispositis ornatâ; sporâ valdè depressâ; anfractu pone callum compresso, sub-mediano, minimè obliquo; peritremate acuto, libero, ovato, pene totam testam circumcludente; callo magno ingrescente; aperturâ lunatâ mediocri; labio recto totâ longitudine denticulato, medio emarginato.

Greatest transverse breadth 0.7 inch. At the first glance this shell would probably be mistaken for the last described species, from which it differs more especially in the greater proportionate size of the aperture, in the perfect parallelism of the inner lip with the axis of the shell, its denticulation nearly throughout its whole length, instead of merely in the centre; in the compression of the whorl at the back of the callus, and its subcentrical position, thereby occasioning the approach of the shell to a symmetrical configuration, and finally in its suite of colours. It is much less frequent than *N. depressa.* I have met with only two specimens, in the Húglí at Fort William, and in Tolly's Nullah, adhering to piles and bricks. The aperture is livid white, with blackish shades. The operculum, following the form of the aperture, is broader than in *N. depressa,* and its two costate teeth are more developed.

36. *Neritina tigrina.* Testâ globoso-conoideâ, corneâ vel olivaceâ, lineis subtilissimis, fasciis angulato-flexuosis, maculisque nigris longitudinaliter strigatâ; suturis obsoletis; anfractu ultimo ventricoso, infrà suturam excavato-depresso; aperturâ obliquâ, intùs albâ; callo columellari maculâ luteâ notato; labio medio emarginato, infrà projecto, emarginatione projecturâque ambabus denticulatis.

The specimens, in the collection, of this very handsome species are of an ordinary size. A fine individual which I took adhering to the piles which defend Fort William from the action of the Húglí, measures 1.35 inches in length. The operculum is very strong, and besides the two exserted mucrones at the lower part, have two strong radiating curved ribs on the inner surface, the central one of which forms, at its termination, a third mucro. In addition to the living examples which I met with in the River Húglí, I have a beautiful specimen which I captured in the aqueduct that supplies the old Course at Calcutta. When decorticated the ground of the shell is white; and the black markings assume a purplish hue.

Two other very distinct species of *Neritina* with oblique apertures inhabit the waters around Calcutta. I propose shortly to describe them as *N. retifera* and *N. obtusa.*

In all the species of *Neritina* of which I have seen the operculum, that accessory piece is smooth and polished, exhibiting only faint radiating striæ or striæ of growth; but in a ribbed *Nerita* which occurs at the embouchure of the Húglí, the exterior surface of the operculum is granulated like shagreen. Is this latter character permanent in the genus *Nerita?* if so, it will furnish an additional mark to distinguish the two genera.

37. *Navicella compressa.* Testâ transversè elongatâ, compressâ, luteâ, albidâ, vel corneâ, lineis munitissimis transversis diversè colo-

ratis, maculisque alternatis radiantibus decoloratis pictâ; dorso elevato; limbi extremitatibus emarginatis. Long. 0. 85. Lat. 0. 45 poll.

From the peculiar form of the aperture of this shell, it is evidently accustomed to adhere to the convex surfaces of cylindrical bodies of small diameter, probably the stems of shrubs growing in the water, to which the sinuous disk would exactly conform. The numerous specimens in the collection all possess the same feature, which is never observable in *Navicella tessellata* of LAMARCK. The last mentioned shell I discovered adhering in abundance to piles in the Húghlí river under Fort William, and more rarely attached to bricks in Tolly's Nullah. I have retained the name proposed for the new species by Dr. J. T. PEARSON.

ACEPHALA.

38. *Anodonta soleniformis.* Testâ elongatissimâ, posticè angustatâ, extremitate rotundatâ; anticè latiore, sub-alatâ, extremitate obliquè truncatâ: Natibus complanatis, inconspicuis, senectute obliteratis, decorticatis; epidermide junioris fulvidâ, præter angulum umbonis viridi, salcis illuc vinis impressâ, ætate fuscâ. Long. 6 poll. Lat. prope apicem 1. 2, Lat. prope alam 1.5 poll.

This is a very interesting shell, being, in proportion to its length, the most elongated of the genus. The pearl of the interior is bluish, with a salmon tinge in old specimens, which are likewise much worn on the exterior surface, and have their posterior muscular impression very deeply marked, and, as it were, carious. The anterior muscular impression is considerably elongated under the transverse direction. With the exception of a minute species which inhabits ponds in *Bundelkhand,* this is the only Anodonta hitherto met with in this Presidency.

39. *Unio cœruleus,* LEA. Trans. Amer. Phil. Socy. vol. 4.

A compressed variety of this shell occurs in the collection.

40. *Scaphula celox.* Testâ elongatâ, tumidâ, læviusculâ, anticè angulatâ, inter umbonem extremitatemque anticam subito evasâ; carino umbonali compresso, costulâ obsoletâ contiguâ.

Scaphula: BENSON, Zoological Journal, Vol. 5, page 464-5, and Gleanings in Science, Vol. 1, Plate VII, fig. 2 and 3.

One or two examples of this rare fluviatile genus of Arcacea which I first discovered in the Jumna, and subsequently met with in the river Cane, occur among the shells brought from the Eastern frontier.

IX.—*Note on Zoological Nomenclature. By* B. H. Hodgson, *Esq.*

If I revert to the comments of your anonymous correspondent upon my *Cervus Elaphoïdes*, (No. 52 for April,) it is because I think that a question of some moment hangs upon the judgment pronounced in this case, viz. the right to designate species, and the consequence of doing so from very imperfect knowledge.

According to your correspondent's own shewing, Cuvier never procured more than the horns of this deer; and, so conscious was Cuvier, ultimately, of his inability to fix the species upon a just basis, that, in his last edition of the Regne*, all mention of it is omitted. Meanwhile, however, he gave it a name, upon retaining which your correspondent insists, although your correspondent, in the very same page, exhibits the following practical consequence of such proceedings.

The first writer of the age upon the tribe of animals to which our *Cervus* belongs (H. Smith) is entirely *misled* by Cuvier's insufficient definition, or rather designation, and ascribes this deer to the *Rusa* group! Now, it is a well known fact, that, although the more skilful general writers upon zoology have, of late years, omitted half the recorded species from inability to verify them, yet that, amongst the species inserted, no careful student can satisfactorily refer to one in ten! Is this system to go on? and, if not, is there any cure for it but a general resolution to admit no names of species which the nomenclator has not, at the time, *or subsequently*, verified?

Your correspondent has only to turn to those recent and costly works upon Indian Zoology, Gould's Century and Hardwicke's Illustrations, and he will find that the multiplication of idle names and of fictitious species is still going on, under the auspices of persons who neither have, *nor can have*, competent means of at once undoing past errors and preventing future ones. Press or picture, it is the same thing. Neither ought to be devoted, in permanent style, to the propagation of delusion and inconvenience; nor any ad interim labours of any man recognised, (except such as he has ultimately himself completed), if their recognition have that effect, at the same ime that it interferes with the just reward of the ripe and adequate labours of others. *Finis coronat opus:* and, though it may be reasonable to admit temporarily all names, as an index and stimulus to discovery, as well as to sustain eventual claims, if advanced, yet those names alone are entitled to permanence which the affixers, sooner or later, connect with indisputable species. Cuvier himself abandoned his name, because he could not eventually so connect it: and I confess I do not perceive upon what sound principle your correspondent insists upon the revival and retention of that name.

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* A new and amended list of all authentic species is given in this edition.

I beg to acknowledge the courtesy of your own note appended to the communication in question, and to state my conviction that Du Vaucel most probably obtained the horns of the Cervus Elaphoïdes from me.

The observation of your correspondent—that the "suborbitar depression on the skull of our deer is perforated by a very large oval hole, which is not found in the skull of the *Jaraï*"—wants, I believe, confirmation. Such holes are very usually found in the skulls of both species; but, so far as my experience goes, they are not proper to the *perfect* skull of either*. After considerable inquiry amongst my friends to the westward, I have determined to retain the name of *Bara Sinha* for the *Cervus Elaphus;* those of *Maha* and *Bahraiya* for *Cervus Elaphoïdes;* and that of *Jaraï* for the only type of the *Rusa* group known to me. This animal is the *Cervus Jaraï* of Hodgson, precisely *because* he has found it utterly impossible to fix the shifting and insufficient specific indications of H. Smith—a difficulty, by the way, which your correspondent seems to share, if I may judge by his somewhat loose allusion to "*Cervus Hippelaphus and Aristotelis* or *Rusas*" (in the plural.) May I hope for his valuable assistance in my endeavours to decide, whether there be really *more than one* species of *Rusa* in the Bengal Presidency? and *which* of the *several* named by H. Smith it or they be? Let me request your correspondent to test the above remarks on nomenclature by applying them to the very difficulty just cited. I am content to abide by the issue!

[We have to apologize for so long delaying the publication of Mr. Hodgson's note, which has been lying in type at the printer's some months. We are very sure the correspondent to whom he appeals will assist in the desirable object of identifying and fixing Indian Species.—Ed.]

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* If they *were*, we should be in the way of ascertaining the probable or possible truth of that startling assertion, that breathing takes place through the suborbital sinus. I have examined repeatedly fresh heads of several species with a view to this assertion: and my conclusion is that it *cannot* be true, unless breath can pass through bone and skin too: for, in the perfect skull there is no solution of continuity in either substance, within the limits of this sinus. *Without* and *above* the sinus, there is something extremely like such a solution, in the sculls of Elaphus, Ratwa, Jaraï and Elaphoïdes. But, even here, a *perfectly fresh* head will exhibit osseous or quasi osseous continuity; and the skin-fold is ever uninterruptedly carried through the sinus, though with much attenuation at the bottom of it.

X.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 7th December, 1836.

The Honorable Sir Edward Ryan, President, in the chair.

H. Walter, Esq. C. S., Principal Bramley, Dr. James Drummond, Nawab Tahawur Jung Behadúr, Sháh Qabir u'dí'n, and Dr. R. A. Jackson, proposed at the last meeting, were balloted for, and duly elected Members of the Society.

Mr. W. Dent was proposed by Mr. H. T. Prinsep, seconded by the Secretary.

Mr. Manuk, proposed by Dr. Stewart, seconded by Mr. Baillie.

Babu Herambana'th Thakur was appointed to officiate as Collector to the Society, during the absence of Babu Ram Comul Sen, on a visit to the Upper Provinces.

The following reply from Government regarding the *Alif Leila* was read:

To James Prinsep, Esq.

Genl. Dept. *Secretary to the Asiatic Society.*

Sir,

I am directed to acknowledge the receipt of your letter, dated the 7th ultimo, relative to the proposition of Mr. C. Brownlow, to publish at his own private risk a complete edition of the Ulif Leila, or Arabian Nights' Entertainments, in the original Arabic, from a very complete manuscript purchased by him from the estate of the late Major Macan, and requesting the same support to this work as has usually been accorded both by the local Governments, and by the Honorable Court of Directors to literary undertakings of a similar description.

2. In reply, I am directed to state that in compliance with the recommendation of the Asiatic Society, and in consideration of the manner in which the publication of this work has been undertaken, and of the credit that will attach to its completion in the manner proposed, his Lordship has been induced to subscribe for fifty copies at the price stated, viz. 48 rupees per copy.

3. The copies when printed will be appropriated for distribution as prizes in the Seminaries of Education at which the study of Arabic is cultivated, with the reservation of such number as the Governor of Bengal may present to the Public Libraries and Institutions of Europe or of this country. Mr. Brownlow may be desired to deliver the fifty copies at this office, where his bill for them will be discharged.

4. But the Right Honorable the Governor of Bengal cannot close the reply to this reference from the Asiatic Society, without expressing a strong desire to learn that the translation of the complete work is likely to be undertaken by some competent scholar of this Presidency. His Lordship will be glad to be informed of any scheme for procuring the accomplishment of this desirable object, that the Asiatic Society may be able to suggest and think deserving of encouragement.

I have the honor to be,
Sir,
Your most obedient servant,
H. T. Prinsep,
Secy. to Govt.

Fort William, the 2nd Nov. 1836.

Resolved, that a copy of the reply be transmitted to Mr. C. Brownlow, the publisher of the work in question.

It was intimated that a gentleman in the Civil Service, eminently qualified for the task, had volunteered to make an English translation of the portions of the "Nights' Entertainments" as yet unedited.

The following letter from the Asiatic Society of Paris, brought out by the Chevalier General **Allard**, was also read:

Société Asiatique, Paris, le 1 *Mars*, 1836.

Messieurs;

Les encouragemens que le Gouvernement Anglais dans l'Inde a accordés presque en tout temps à la publication des ouvrages classiques dans les langues savantes de l'orient ont toujours été regardés en Europe, comme un de ses plus beaux titres de gloire. Ces publications ont puissamment aidé au développement que les études historiques et philologiques ont pris depuis le commencement de ce siecle, et elles ont servi a répandre le gout des lettres orientales. Ainsi les ouvrages classiques publiés par le Comité d'Instruction publique de Calcutta, quoique destinés immédiatement aux écoles Indiennes ont rendu aux écoles de l'Europe les plus grands services. Ils ont commencé à remédier à la rareté des manuscrits sanscrits en Europe, et ont facilité l'étude d'une littérature dont l'importance pour l'histoire de l'esprit humain n'a pas cessé de s'accroître.

Le Comité avait donné, dans les derniers temps, l'espoir que l'on verrait encore s'aggrandir le cercle de ses entreprises. Il avait annoncé que le Mahâbhârat, le Rája Tarangini et plusieurs autres ouvrages de la plus haute importance, étaient sous presse, et qu'il préparait des materiaux pour une édition des Vedas et des livres sacrés des Bouddhistes. Ces annonces ont été reçues en Europe avec un intérêt marqué, et les savans ont suivi avec une grande sollicitude les progrés de ces ouvrages. Mais on a appris derniérement, que le Gouvernement du Bengale a cru devoir suspendre toutes les impressions en langues Orientales, et destine les fonds qui devaient y pourvoir, à un but différent.

Il n'appartient pas á une Société littéraire de juger des raisons politiques ou financières d'un gouvernement étranger, mais la Société Asiatique croit pouvoir exprimer ses regrets qu'on ait abandonné des entreprises qui auraient servi les intérets de la science, et qui auraient honoré la nation qui les avaient commencées. Aussi, a-t-elle sincèrement applaudi à la détermination que vous avez annoncée, Messieurs, de reprendre la publication de ces ouvrages, et elle désire vivement pouvoir vous aider dans l'accomplissement de votre plan. Elle vous offre en conséquence de servir d'intermédiaire entre vous et les Savans du Continent. Elle espére pouvoir trouver un nombre plus ou moins considérable de souscripteurs aux différent ouvrages que vous avez l'intention de faire paraître.

Si vous agréez ce plan, elle vous prie de lui communiquer la liste des ouvrages à publier, et les prix approximatifs de chacun. La Société redigerait alors un programme et une circulaire, pour faire appel á ses membres et aux divers corps savans, a fin d'exciter autant que possible l'intérêt du public pour les importantes publications de la Société.

It est impossible d'apprécier d'avance le resultat de cette démarche, mais la Société croit ne faire que son devoir en donnant aux savants Européens les moyens de s'associer à votre généreuse entreprise.

Nous avons l'honneur de vous offrir, Messieurs, l'assurance de notre haute considération.

P. **Amidei Jaubert**, *Président de la Société.*
Eug. Burnouf, *Secrétairé de la Société.*

Resolved, that an appropriate reply be returned in the same form to the Asiatic Society of Paris, accepting with pride and satisfaction its generous offer of aid in promoting the completion of the abandoned oriental works, and of acting as the channel of their circulation and sale on the continent of Europe.

A letter from Major **Troyer**, tendered, in the same spirit, his service as agent to the Society at Paris, and acknowledged receipt of presentation copies of Sanscrit works.

Extracts of letters from Messrs. **Burnouf**, **Jacquet**, and Professor **Lassen**, connected with the same topic, were read; also from Messrs. **Cas-**

sin, agent and bookseller to the Paris Society, suggesting arrangements regarding the prices of the several works.

A letter from M. Rouy de Rochelle, President of the Geographical Society of Paris, stated that a resolution of the Society had determined to present the Asiatic Society with a complete series of their *Bulletin*, anterior to the period when its relations with Calcutta had commenced.

Resolved, that the compliment be returned by presenting a copy of such former volumes of the Researches as are in store.

A letter from Mr. Edward Thomas, C. S. at Almorah, presented three manuscript volumes in short-hand of the late Mr. Laidlay.

They appear to be private note books, and memoranda of the author's reading—not in the common form of stenography, and therefore illegible.

Dr. D. Stewart presented copies of the Proceedings of the Statistical Society of London for 1835-36, and series of questions and forms for circulation, with a view of extending its information on subjects connected with the science.

The President founded upon these documents, a motion for the formation of a Committee in the Society, which should direct its exclusive attention to the Statistics of India, both by inviting returns to circulars modified to suit the circumstances of the country, and by searching, with permission, the records of Government.

Mr. H. T. Prinsep urged that the magnitude of the object was beyond the power of a Committee; the Government had at one time expressly commenced such a record, and had given it up after spending a lakh and a half of rupees on three small districts.

Dr. Stewart thought that the materials collected might be examined and abstracted by the Committee, and, without aiming at minute detail, much useful information might be obtained on the population and mortality, for instance, of the principal towns. He had himself lately roughly estimated the mortality of Calcutta, and was appalled at finding it 1 in 26, the highest rate almost on record. After some discussion it was

Resolved, that a Statistical Committee be formed, consisting of Sir B. Malkin, Mr. J. G. Gordon, Mr. W. Adam, Mr. Baillie, and Dr. D. Stewart,* the latter gentleman kindly undertaking the duties of Secretary.

Library.

The following books were presented.

The Archaelogia, or Transactions of the Antiquarian Society of London—*by the Society.*

Transactions of the Geological Society of London, vol. iii. part 3, and vol. iv. part 1—*by the Society.*

Journal of the Royal Asiatic Society of London, No. 5—*by the Society.*

Proceedings of the Geological Society of London, Nos. 40, 41, 42, 43, 44, and 45—*by the Society.*

Sir Phillip Grey Egerton's Catalogue of Fossil fish in his own and Lord Cole's Collection—*by the Author.*

Address delivered at the Anniversary Meeting of the Geological Society of London, on the 19th February, 1836, by Charles Lyell, M. A., F. R. S. President of the Society—*by the Society.*

Memoires de la Société de Physique et D'Histoire Naturelle de Genève, tome vii. pt. 1—*by the Society.*

Two Tibetan block-books, religious tracts, entitled *Smon-lam-bischu-tham-ab-yorbai-smon-bsngo-ba ;* and *Bchom-ldan-hdas-ma-sches-rab-kyi-pha-rdi-tu-phy-inpai-sning-po ;* printed at Leipsig—*by M. Jacquet.*

Glagolita Clozianus ; Codicis Glagolitici Antiquissimi, Leipsanon folioriom servatum in Bibliotheca Paradis Cloz Tridentini, by *Bart. Kopitar*, Curator of the Imperial Library at Vienna—*presented by the Author.*

Gefchichte der Osmanifshen Dichtlunft—*by the Baron Von Hammer-Purgstall.*

Lectures on Comparative Anatomy, by Dr. Robert E. Grant—*by the Author.*

Bulletin de la Société de Geographie, vol. i. iii. iv. to x. and xvi. to xx. of the first series ; and vol. iii. iv. of the second series—*by the Society.*

Abrégé du Roman Hindustani intitulé La Rose de Bakawali, par M. Garcin De Tassy—*by the Translator.*

Mode d'Expression Symbolique des Nombres employés par les Indiens, les Tibetains et les Javanais—*by M. Jacquet.*

Journal Asiatique, Nos. 90, 91, 92, 93, 94, 95, and 96, for 1835, and Nos. 1, 2, and 3, of the New Series for 1836—*by the Asiatic Society of Paris.*

Madras Journal of Literature and Science, No. 13—*by the Madras Literary Society.*

The Indian Journal of Medical Science and Scientific Review, No. 12—*by Dr. F. Corbyn, the Editor.*

A copy of the Old Testament, translated into the Burmese language, by the Rev. A. Judson—*through Rev. Howard Malcom.*

Gay's Fables, translated into Urdú Poetry, by Raja Kalikissen Behadur—*the Translator.*

"Mashtoz," or the Ritual of the Armenian Church ; in two volumes, printed in Calcutta, and *presented by the Editor, Mr. Avdall.*

The Meteorological Register for October 1836—*by the Surveyor General.*

The following books, selected by Professor Wilson, were received from the Booksellers :

Eichhoff Parallele des langues de L'Inde. Paris, 1836, royal 4to.

Freytag's Hamasæ Carmina, 4to. (in Arabic.)

Amrulkeisi Moallakah, Arab. et Lat, ed. J. A. Hengstenberg, Bonn, 1823.

Kosegarten, Amrui ben Kelthum Taglebitae Moallakam Abn Abdallae, 4to.

Humbert, Arabica Chrestomathia Facilior, 8vo.

Rosenmuller, Institutiones ad Fundamenta Linguæ Arabicæ, 4to.

Bernstein, Hetapadaesi particula, edidit et Glossar. Sanscrit, 4to.

Wustenfuld, Abulfedæ Tabulæ quædam, &c. 8vo. Gott. 1835.

Flugel, Corani Textus Arabicus ad fidem lib. MSS. 4to. calf and lettered.

Pettigrew's Egyptian Mummies, 4to. ditto.

Gutzlaff's Voyage to China, post 8vo. ditto.

Auber's British Intercourse with China, 8vo. ditto.

De la Beche's Geological Manual, 8vo. ditto.

McCulloch's Commercial Dictionary, 8vo. ditto.

Moor's Oriental Fragments, post 8vo. ditto.
Wight and Arnott's Prodromus, 1 vol. 8vo. ditto.
Gutzlaff's History of China, 2 vols. 8vo. ditto.
Bennett's Wanderings in New South Wales, 2 vols. 8vo. ditto.
Smith and Dwight's Missionary Researches in Armenia, 8vo. ditto.
Robert's Illustrations of Sacred Scriptures, 8vo. ditto.
Wilkinson's Topography of Thebes, &c. 8vo. ditto.
Breton's Scandinavian Sketches, 8vo. ditto.
Hoskin's Travels in Ethiopia, 4to. ditto.
Robert's Scenes &c. of Hindoostan, 3 vols. post 8vo. ditto.
Wellesley's Dispatches, vol. 1. ditto.
Malcolm's Memoir of Lord Clive, 3 vols. 8vo. ditto.
Laborde's Mount Sinai and Petra, 8vo. ditto.
Carey's Memoir of Dr. Carey, 8vo. ditto.
Rich's Koordistan and Nineveh, 2 vols. 8vo. ditto.
Edinburgh Cabinet Library—China, 3 vols. 12mo. ditto.
Abeel's Residence in China, 12mo. ditto.
Nala and Damayantí, by Milman, imperial 8vo. ditto.
Akermann's Catalogue of Roman Coins, 2 vols. 8vo. ditto.
Madox's Excursion in the Holy Land, 2 vols. 8vo. ditto.
Lang's History of New South Wales, 2 vols. post 8vo. ditto.
Seale's Geognosy of the Island of St. Helena, folio, cloth.
Wight's Contributions to the Botany of India, 8vo. calf and lettered.
Davis's Chinese, 2 vols. post 8vo. ditto.

Antiquities and Literature.

Mr. Walter Ewer, in a note, adverted to Mr. Traill's drawing, of the *Garhwal* tridents.

The proportions of the trident of *Barahát* are incorrectly large for the staff, (see Plate XXIX.)—the edge of the axe should be at right angles to the trident, and consequently not visible laterally on the sketch:—the letters of the inscription also do not project from the surface, but are indented. The words are sufficiently correct.

Lieut. Barton, on his departure for Europe, begged the Society's acceptance of a copy in manuscript of Bahadin's Life of Saladin; also of Napoleon's acount of the Campaign of 1805, printed in Arabic at Alexandria.

Captain Jenkins forwarded a copy of the Ahom alphabet, compared with the Bor Khamti, Shyán, Laos, and Burmese, with explanatory notes by Rev. N. Brown.

This alphabet has been a desideratum for some time, and as very few indeed of the inhabitants of Assam are now acquainted with this extinct character, preserved chiefly on the coins of the indigenous rájas, an opportunity had been sought in vain for recovering it, until Mr. Brown's residence and study brought him in communication with some pandits who have given the desired information. We hope to publish it in our January number.

Mr. J. G. Heatly submitted a second paper on Analytic Geometry.

Physical.

Geological specimens from Kemaon, with a descriptive catalogue.—

Also, a list of the rock specimens from the Kasíya range and Assam, formerly deposited in the Museum, presented by Dr. McClelland.

A fine series of butterflies, moths, and insects from Sagur was presented by the Secretary, being part of a rich collection forwarded to him by Major Hearsey, Commanding 2nd Local Horse.

Volcanic ashes picked up at sea by Captain Fergusson, of the ship *Henry Tanner*, presented by Mr. T. L. Henley.

" The position in which these ashes were picked up was 35 miles South lat. and 15° 50′ west long. The sea was in violent agitation.

On a former voyage by the same commander, in nearly the same place (lat. 1° 35′ S. and long. 20° 45′) much alarm was created on board by a violent rumbling noise, the captain and officers believing the ship to have struck and grating over a coral reef: no bottom, however, was found on sounding.

In the same latitude and about a degree more easterly, there is a shoal laid bearing the name of some vessel, but considered doubtful."

The ashes are black, and resemble cinders or pumice in consistence.

A collection of lichens from the Himálaya Mountains, was presented for the Museum, by Mrs. Siddons.

A specimen of Adjutant, *(Ciconia Argala,)* presented by Dr. O'Shaughnessy, and mounted in the Museum.

A specimen of the Modern Crane of Latham, purchased and mounted in the Museum.

Note.—The latter of the above specimens is generally considered as the young bird of the former, although Latham thinks it a distinct species. The attention of observers is requested to the point.

A skeleton of the Hindústání Bullock, presented by Captain Cartwright, and articulated in the Museum.

A ditto ditto, presented by Major Tennant.

A stuffed specimen of Albatros, *(Diomedea exulans,)* presented by Mr. J. W. Linton of Howrah.

A specimen of the Nípal Musk Deer, and of the *Ailurus Fulgens* or " Wah" of the Bhotiahs, by Dr. A. Campbell, of Katmandhú.

Papers Communicated.

Notice of Balantium, a genus of Pteropodous Mollusca inhabiting the Southern Indian Ocean, by W. H. Benson, Esq.

Notice of the Musk deer of Nípál, taken at a postmortem examination, by Dr. A. Campbell.

Observations on the anatomy of the plants of the order Hepaticæ, accompanied with a series of beautiful Iconographic drawings of specimens of the three sections. *Jangermannia*, *Marchantia*, and *Riccioideæ*, by Dr. Wm. Griffiths, Assam.

Remarks on the Silk-worms and silks of Assam, with specimens of the moth, worm, chrysalis, cocoon and silk, by Mr. Thomas Hugon, illustrated with drawings by Mr. Hudson, Deputy Revenue Surveyor, were forwarded by Major Jenkins, Governor General's Agent in Assam.

Having been placed in the hands of Dr. J. H. Helfer for arrangement and examination, that gentleman read at the close of the Meeting a paper on the indigenous silk-worms of India.

Dr. **Helfer** commenced by a series of observations on the importance of silk as an article of wearing apparel throughout the globe. He stated that the discovery of India and China was valuable to the ancient Greeks and Romans, chiefly on account of the precious web of the Bombykia, called *Se* or *Ser*, whence the newly discovered countries derived their name of *Serira*. **Justinian**, said Dr. H., obtained an insight into the secret of its manufacture from two Persian monks, the first silk being fabricated at *Byzantium*. Dr. **Helfer** followed up his subject by stating, that the Sicilians in the time of **Roger** I. became wealthy by the introduction of silk into *Palermo*,—that the Venetians acquired riches by the trade of silk with the Levant, and that in our days it is an unlimited source of income to countries cultivating it on a large scale. France alone exported in the year 1820, 130 millions of francs worth of silk, and England consumes annually 4,700,000 pounds, for which it is chiefly indebted to foreign countries.

Dr. **Helfer** considers India particularly suited for the cultivation of silk, and deems it very interesting and important, that this country possesses already eleven known different kinds of silk-worms, producing in abundance silk of different qualities, and having by this the internal means of providing all Europe with this precious material. He enumerated the eleven different species, of which seven (though silk from them has been manufactured), never have been mentioned before. (The subject was illustrated by the exposition of all the different qualities of silk, the preserved moths, cocoons, chrysalis, and eggs.) Two of the silk-worm species, the Tusseh and Arrindy, were known in India, and their silk was considered singular enough in Europe, and regarded as inferior qulity of the mulberry silk-worm,—though Dr. **Roxburgh** and Dr. **Buchanan**, had long ago published an account of them, which Dr. H. quoted. Two different species were discovered by Dr. H.; four others were mentioned as problematic, and three other new species sent from *Assam* by Capt. **Jenkins**, accompanied by a very interesting memorandum. Dr. H. deems those sent from *Assam* exceedingly valuable, as the cocoons which they produce are considered by Mr. W. **Prinsep**, exceedingly fine.

Dr. **Helfer** then, after giving a systematic description of all the new species, went into the question as to whether the silk of India is naturally inferior to that of other countries. He regards the question as undecided, and considers that every thing must depend upon the rearing of the worm in houses—upon the quality of their food—upon the first chrysalic operations—and upon the manner of working the silk. He proposed that all moths producing cocoons—which, judging by analogy, he computed at upwards of 130 kinds in India,—should be examined, and specimens of raw and wrought silk sent to Europe; and he thinks it certain, that, by the manufacture of silk on a large scale, a vast revenue will accrue to this country. He referred to the value set in Europe upon the coarsest material produced by the Arrindy silk worm. The Doctor concluded his very interesting discourse by narrating a fact communicated by Dr. **Glass** of *Boglipur*. It appeared that Dr. G. had sent specimens of the silk to England: when it was shewn to the different manufacturers they answered, that the people in India had been deceiving them by stating that the fine Cashmere shawls are manufactured from the wool of the goat: it was plain to them that the shawls were composed of the silk, and they said, that, with *that* material, they, the English manufacturers, could make better shawls than any which came from India.

The President, on behalf of the Society, acknowledged their obligations to Dr. **Helfer** for his interesting paper.

(We shall hasten to print it when the drawings of Mr. **Hudson** can be engraved.)

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of November, 1836.

Day of the Month.	Observations at 10 A. M.							Calculated Humidity.		
	New Stand. Barometer red. to 32°.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew point.	Hair Hygrometer.	Centesimal tens. of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.
1	29,856	,898	80,7	4,1	3,9	70,2		80	72	
2	,773	,806	78,7	3,1	3,0	70,3		85	77	
3	,769	,802	80,5	3,2	3,0	72,5		85	77	
4	,887	,922	79,0	7,4	7,0	67,0		66	68	
5	,932	,971	80,9	9,1	9,7	58,8		68	44	
6	,944	,979	76,1	7,2	7,5	62,0	82,0	65	63	
7	,906	,948	79,6	10,9	10,8			52		
8	,980	,020	79,1	8,3	8,4	62,2	79,0	62	58	
9	,962	,992	77,9	7,1	7,3	64,0	83,0	62	64	
10	,902	,947	77,1	6,9	6,7	64,0		67	66	
11	,888	,923	78,7	9,8	10,5	60,5	76,	55	58	
12	,927	,969	78,3	9,0	9,7		77,	60		
13	,988	,035	78,4	9,2	9,0	63,0	80,	57	61	
14	,009	,056	79,3	9,5	10,0	63,2	79,	57	59	
15	,987	,030	78,5	10,1	10,5	60,3	75,	52	55	
16	,948	,977	77,1	8,9	8,6	60,7	81,	57	58	
17	,914	,945	77,5	9,1	8,6	60,0	80,	57	56	
18	,926	,961	76,7	8,4	8,6	60,0	80,	60	58	
19	,941	,978	75,1	6,7	6,8	59,8	83,	67	61	
20	,923	,965	75,7	7,0	7,0	60,5	83,	65	61	
21	,889	,945	76,7	9,5	10,0	56,3	79,	55	52	
22	,902	,950	75,0	7,7	7,2	60,5	74,	62	62	
23	,860	,902	74,8	6,2	6,0	64,8		70	72	
24	,856	,903	74,9	8,3	8,0	58,8		60	77	
25	,872	,906	72,2	9,5	9,4	59,0		52	65	
26	,908	,942	70,7	13,1	13,0			35		
27	,993	,041	68,3	11,3	11,7	45,3	71,	40	55	
28	,029	,068	71,0	11,3	11,3		73,	42		
29	,025	,067	71,3	7,0	7,0	54,8	77,	62	61	
30	,038	,080	71,7	7,9	7,4	55,5	72,	60	59	
Mean,	29,928	,964	76,3	8,2	8,2	61,3		60	62	

Day of the Month.	Observations at 4 P. M.							Calculated Humidity.			Register Thermometer Extremes.		Rain.	Wind.		Weather.	
	New Standard Barometer.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew-point.	Hair Hygrometer.	Centesimal tension of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.	Cold on roof.	Heat in sun.		10 A. M.	4 P. M.	Morning.	Evening.
1	29,764	,802	76,3	2,3	3,3	71,0		87	84		71,7	91,7		e.	S. W.	cloudy.	showery.
2	,647	,695	83,5	6,7	6,3	68,8		70	62		67,5	95,4		W.	nw.	do	clear.
3	,679	,725	84,1	7,7	7,5	66,5		67	62		72,2	91,0		S.W.	S. W.	do	cloudy.
4	,772	,820	84,7	9,2	8,9	63,5		62	51		66,4	111,0		ne.	nw.	cir. cumulus.	fine.
5	,832	,884	84,4	16,6	14,8	56,6		35	49		65,8	106,8		N.W.	N.	fine.	clear.
6	,800	,860	83,5	14,6	14,4			40			59,8	103,0		N.	nw.	clear.	do
7	,803	,865	84,4	13,6	14,2			45			60,8	102,5		N.	nw.	do	do
8	,847	,912	83,7	14,5	14,7			40			58,8	110,6		E.	w.	hazy.	do
9	,787	,904	81,1	12,7	11,5	60,0	73,0	45	50		59,3	110,6		w.	ne.	clear.	do
10	,765	,831	81,9	13,1	12,1	60,5		45	50		60,8	104,5		n.	n.	do	do
11	,771	,826	81,7	12,4	11,7		74,0	46			62,3	105,6		o.	nnw.	cumuli.	cumuli.
12	,830	,888	82,1	12,7	12,7	58,0		49	46		60,0	102,8		ne.	S. E.	fine.	clear.
13	,880	,946	82,6	12,2	11,3	61,5	74,0	49	51		62,1	105,2		n.	ne.	do	do
14	,887	,940	82,5	12,5	10,8	62,0	74,0	49	57		63,8	111,7		n.	o.	do	do
15	,843	,897	80,9	13,4	12,5	56,1	73,0	42	44		59,0	98,7		ne.	w.	do	do
16	,813	,888	80,9	13,4	12,8	55,0	72,0	42	43		58,5	94,8		n.	nw.	do	do
17	,806	,879	80,2	13,7	12,5	58,0	72,0	42	49		57,8	97,5		n.	ne.	do	do
18	,823	,890	81,0	13,7	13,0	59,0	71,0	42	49		58,2	102,0		n.	n.	do	do
19	,797	,856	80,7	13,4	12,3		71,0	42			57,3	107,8		n.	n.	clear.	do
20	,767	,830	79,8	12,6	11,5	58,5	74,0	45	50		59,2	105,8		nw.	n.	do	do
21	,758	,828	79,1	11,3	10,6	56,6	73,0	50	48		59,8	116,5		W.	nw.	do	hazy.
22	,785	,856	79,7	11,4	11,0	56,0	72,0	50	46		61,5	95,0		n.	se.	cloudy.	cloudy.
23	,729	,788	78,6	10,0	9,1	59,0	74,0	55	53		64,1	85,0		ne.	ne.	do	do
24	,738	,793	78,1	8,8	8,0	59,0		60	54		62,6	85,0		ne.	ne.	do	do
25	,747	,801	78,7	12,9	11,9	57,2	72,0	42	50		57,4	89,0		n.	ne.	overcast.	fine.
26	,791	,850	72,3	75,9	17,2	49,0	75,0	25	46		53,9	88,0		nw.	n.	clear.	clear.
27	,879	,940	75,4	14,9	12,8		66,0	32			50,0	93,0		n.	nw.	do	do
28	,816	,956	76,2	12,9	12,0		71,0	40			53,2	94,0		n.	n.	do	do
29	,896	,958	77,0	11,0	10,4	46,6	73,0	50	36		52,2	94,0		nw.	nw.	do	do
30	,915	,986	77,1	11,7	10,6	47,2	72,0	47	37		56,0	92,0		N.	N.	do	do
Mean,	29,795	,862	80,3	12,0	11,4	58,5		47	50		59,0	99,8	0,18	light northly.		dry fine weather.	

New Standard Barometer lower than old at 10 A. M. 0,036 and at 4 P. M. 0,067 inch. Captain Henning of the Windsor has obligingly afforded me another opportunity of comparison with the Royal Society's Standard Barometer, by his new and excellent marine Barometer which had been found to stand too low on a mean of 5 observations, 0,02[illegible] (at 32°) the same stood higher than my old standard at 10 A. M. 0.003 and at 4 P. M. lower 0.009; making my old standard lower than the Royal Society's instrument 0,020. No correction applied for capillarity. My new Standard stands in like manner too low, at 10 A. M. 0.063, at 4 P. M. 082 inch. The hair hygrometer this month was unfortunately broken.

Fig: 1

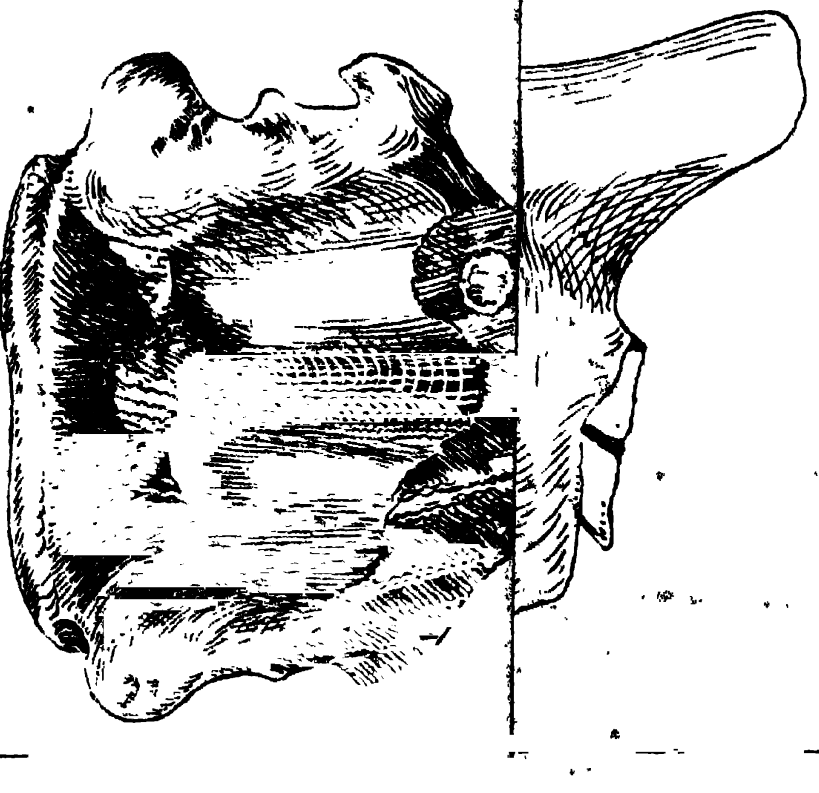
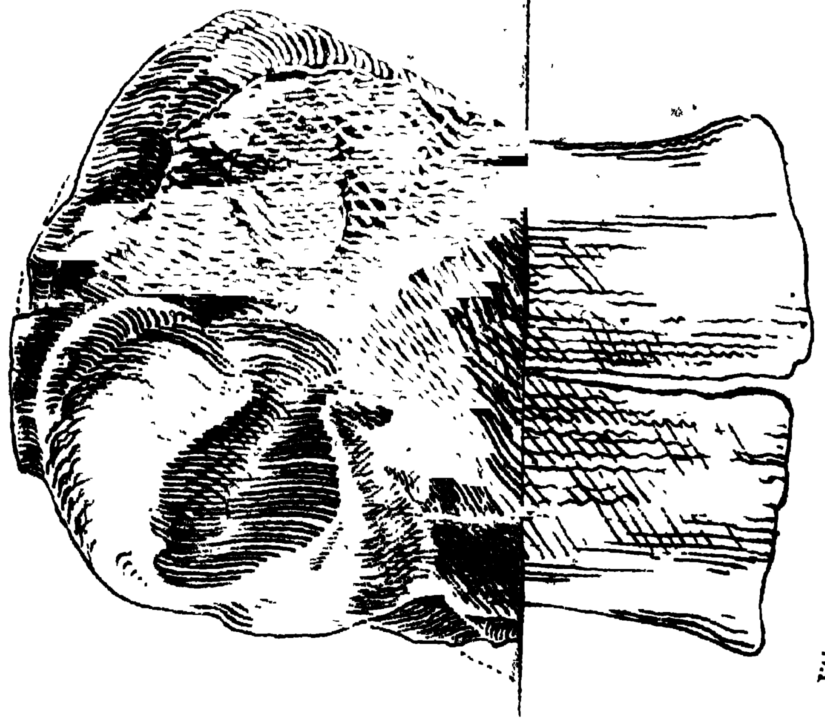


Fig: 2



P. T. Cautley lithog.

JOURNAL

OF

THE ASIATIC SOCIETY.

No. 60.—December, 1836.

I.—*Geological Notes on the Northern Conkan, and a small portion of Guzerat and Kattywár.* By CHARLES LUSH, *M. D.*

[Communicated by the Medical and Physical Society of Bombay.]

In a paper which recently appeared in the Journal of the Asiatic Society of Bengal by Dr. BENZA, on the Geology of the Nilgherry hills, it is remarked that "the elevation of this plateau, and probably the whole chain of the Western Ghats, of which the Nilgherries are the southern termination, happened at a period long anterior to the existence of life on our planet."

This appears, at first sight, a bold and sweeping conclusion: but I apprehend that those who have travelled in the *Dekhan*, the *Southern Conkan*, and that part of the *Carnatic* termed with us "*Southern Maratha country*," will not only be ready to concur in this opinion, but perhaps to extend it so far as to doubt the existence of any formation containing fossil remains in any part of Western India to the southward of *Cutch*.

In that province, it has been stated that oolite occurs. I believe, however, that no sufficient investigation has been made into this fact, to entitle us to assume the identity of such shell-stone with the recognized oolitic formations of other countries, so as to satisfy the rigorous views of a modern geologist.

There is a new era in geology. It is now in the power of any person who travels through countries where "the crust of the globe is untouched by the hammer of the geologist," to contribute to the advancement of this, the youngest of the sciences. By avoiding speculations, not even giving a name to that which is found,—by fully noting the site of specimens collected, according to the directions published by the Geological Society of London,—by forwarding collections to those persons who are best capable of comparing and identifying fossil remains,—materials will gradually be formed for a geological map of India, as well as for the development of sound doctrine regarding the mode and date of deposits. Let the traveller who goes northward over the platëau of the *Dekhan*, or who follows up the coast of the *Conkan*, conclude with Dr. BENZA that the primary, the trap and the laterite rocks—nay, even the alluvial covering these, are antecedent to the existence of animal life on our planet. But, on finding in parts of the *Southern Conkan*, and especially in the island of *Bombay*, horizontal strata of sandstone containing shells, it would be well to look with more suspicion to the northward, and to be prepared to doubt the non-fossiliferous character of the rocks. The shell-stone of *Bombay* will, I hope, be investigated agreeably to modern rules, and materials furnished to those who are capable of deciding whether any, or what proportion of the shells belong to extinct species. It is easy to name this stone "coral rag," and it would cost no labour to speculate upon its being simply a deposit actually going on at the bottom of the *Bombay* harbour; a deposit here and there brought to light in consequence of portions of the present island having been gained from the sea since the place became a settlement. This question can only be determined in one mode;—by the examination and comparison of a few hundreds of species of shells. Decide then whether all are existing, or part extinct. Leaving this important matter for the investigation of some persons at the Presidency, I proceed to copy a few notes collected in a tour through the *Northern Conkan*, part of *Guzerat*, and *Kattywár*.

The most remarkable geological feature in the *Northern Conkan* between *Bassein* and *Surat*, is the extensive degradation and partial reproduction of land at different periods. Occasionally, denuded strata are met with, the date of which can alone be determined by the nature of their organic remains. The first place at which I remarked strata of sandstone similar to those of *Bombay*, was at *Mahim*, (*Northern Conkan*.) There is a low cliff of from ten to twelve feet in height, composed of horizontal strata from one to three or four inches in thickness. On leaving the town of *Mahim* the road passes over a tract of some extent formed of these shell strata, which after some intermediate alluvial, which conceals the nature of the subjacent formation, reappear at the coast under the fort and public bungalow of *Seergaum*.

As there has been a great destruction of land at this place, the cliff under the bungalow may be viewed with interest. It averages about 20 feet in height above the ordinary level of the tides. The upper five feet is alluvial, the lower fifteen feet consisting of horizontal strata of sandstone in different states of aggregation. Nearly at right angles with the fort of *Seergaum*, a point of land runs out towards the sea, of the same general aspect as the strata just described. This seems to have been once continuous with another portion reaching out from the coast, at a distance of about five miles to the northward. The natives state that the whole bay was once land. The destruction seems to have stopped for the present at a Mussulman burying ground, where human bones may now be seen exposed; and which the fossil seeker must be careful to distinguish from "organic remains of a former world." If after another shifting of place between sea and land, a deposit should be formed above, so as to press and solidify the sand, containing skeletons, a mistake of this kind may as easily occur here, as it did at *Guadaloupe*.

The road through *Tarapúr, Dannú* and *Jyebúrdí* affords many opportunities of seeing sections of these strata,—all horizontal and evidently above the trap. Trap rocks still form the gradually diminishing hills inland, being the continuation of the Western Ghat range. Where the trap is exposed, as in some of the numerous creeks, it presents the same weather and water-worn appearance as in the rivers of the *Dekhan*.

It has been assumed (seemingly by Professor Jameson*) in a late summary of the geology of India, that the trap formation reaches to the *Nerbudda*. I therefore presume that there exists no written evidence to the contrary. This mistake has probably arisen from rolled pebbles of trap having been seen in the bed of the *Nerbudda*, opposite the *Kabbír Bar* a few miles above *Broach*; or it may have been a simple conjecture. The fact is, that the trap ceases on the coast between *Balsár* and *Gandávie*. The last hills being those called *Dúngrí*, a low range near the village so called, scarcely more than 100 feet in height and composed of porphyritic trap. The well known hill fort of *Punera*, near the town of *Balda Párí*, is the last trap hill of any height in this direction. At *Gandávie* are strata of clay, containing *kankar*, and from this point we take leave of trap, as well as of shell *sandstone*: *kankar*, and clay of various forms now present themselves in the only sections seen from *Gandávie* to *Surat*. The form and situation of the *kankar* at *Dúmus* demands future notice. The point of geological interest about *Surat* is the constant destruction and partial renovation of land. But especially we note here destruction and *degradation* by freshes and spring tides, where the water is all powerful, and there are no " antagonist forces," such as are imagined by those who are inclined to slight actual causes, and to controvert the principles so ably developed by Mr. Lyell. I cannot avoid here remarking, as it is a point so àpropos to the country under consideration, that a strange assumption has gone forth with regard to the powers and magnitude of tropical vegetation and its agency on the crust of the globe; as if it were a *general* law of nature that the nearer we approach to the equator, the thicker the vegetation. So that tropical vegetation must have essentially a greater power of resistance to the destruction of land than extra-tropical. Such a position is manifestly untenable on the old continent, whatever ground there may be for the opinion in the *West Indies* and *South America.* In *Guzerat* and in the *Dekhan* bareness of natural vegetation is the prevailing character; while even in *Malabar,* where the most rank vegetation exists, I have been shewn such devastation from the sea alone, that I am inclined to think that no " antagonist power" of vegetation can be worth considering. An eminent geologist*, adverting to the doctrines of Mr. Lyell, asks, " Are there no antagonist powers in nature to oppose these mighty ravages? no conservative principles to meet this destructive agency? The single operation of vegetation is a vast counterpoise to all." (!)

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* Vide British India, vol. iii. Art. Geology.

Should we interrogate nature in *Guzerat,* especially about the *Tapti* and *Nerbudda,* we shall find that the conservative principles of vegetation stand no chance against the destructive agency of water.

On the plateau of the *Dekhan,* degradation can only be slightly repaired in one place, by the operation of degradation from a higher level and subsequent deposit below. At the level of the sea in the *Northern Conkan* and in *Guzerat* the rains carry away vegetable mould and vegetation with it. The denuded tracts support no vegetation capable of protecting the land on which it grows from farther loss. The tides with the small portion of sediment they deposit, bring no contribution to vegetable soil. Should they throw up a shoal between the periodical rains, the next fresh would certainly carry it away. The " antagonist powers" are here freshes and tides, but they both tend to the destruction of vegetation, and to throw insuperable obstacles in the way of its renewal.

Proceeding from *Surat* through *Oolpar* to the *Kim* river, nothing but black cotton soil occurs until you cross the *Kim,* at the village of *Kudrama,*—there sandstone and conglomerate are exposed at the surface.

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* Professor Sedgwick.

River Kim, section of the right bank at Sawal.

No. 1. Alluvial containing irregularly imbedded masses of conglomerate, 6 feet.

No. 2. Three feet of horizontal strata of sandstone from one to two inches in thickness.

No. 3. Five feet of sandstone varying in hardness.

No. 4. Bed of the river, consisting of course conglomerate, coarser than the imbedded masses No. 1.

There is no sign of stone of any kind on the left *Oolpar* bank of the *Kim*. This formation of conglomerate and sandstones, is only known in this tract of country to extend from the village of *Koba,* through *Elao* and *Sawal* to *Súnú*.

There is reason to believe that the same rocks form the *Raj-pípla* range of hills and portions of the peninsula of *Kattywár*. The central ridge of *Kattywár,* of which the celebrated hill of *Politana* forms a part, is undoubtedly trap, the usual varieties of which are met with at *Baunagar*. The most remarkable part of this formation (of sandstone, &c.) is the cornelian deposit at the celebrated mines near the *Nerbudda* at *Rattanpúr*. These mines were described by Mr. Copland, Trans. Lit. Soc. Bombay. The general account is correct, but Mr. C. is in error with respect to the appearance of igneous action upon the hill of *Bawa Gorea,* which consists of sandstone and conglomerate rocks,—but not a trace of trap.

Leaving the town of *Okleysir* on the south bank of the *Nerbudda**, on the road to the cornelian mines through *Sarapúr, Clareville* and *Rappalsárí,* the flat black cotton soil plain gradually begins to undulate; and in a nullah near the new village of *Clareville* I saw the first appearance of stone (kankar of course excepted) even in fragments since crossing the *Kim*. The masses were sandstone and conglomerate. The soil now mixed with sand here gradually loses its tenacity and fitness for cotton cultivation. At length, under *Rattanpúr,* the place where the cornelians are brought to undergo the process of baking, a clear section occurs on the bank of a nullah or small river of rather saltish water opposite the village, shewing under a superficial stratum of alluvial, 5 feet thick strata of sandstone, 25 feet deep, inclined at an angle of about 70°.

* From *Hansót* to *Sugód* (and I presume farther) may be seen a deserted bed of the *Nerbudda,* the bank varying in height, consisting of clay with regular horizontal deposits of kankar. The large tank at *Sujód* is evidently a portion of the old bed of the river.

The direction of these highly inclined strata is N. E. and S. W., corresponding to similar strata on the opposite or *Rattanpúr* side of the nullah,—dip N. W. The extent of this section, as far as it is well exposed, is about 40 feet of the bank.

The banks of the nullah above *Rattanpúr* shew irregularly stratified masses of a compact earthy rock with dendritic figuring; also a conglomerate containing some appearances, though not quite unequivocal, of fossil bone. These are not accompanied, as far as I could observe, by fossil shells, and it is only from having since found undoubted fossil matter in similar deposits that I have thought them worth forwarding for comparison.

This nullah contains rolled masses of jaspers, various agates, &c. &c., but no trace of a rolled piece of any variety of trap as may be seen in the bed of the *Nerbudda* near the *Kabbír Bar.*

In the village of *Rattanpúr* the cornelians are collected and exposed to the air for a month or two. If on being chipped they are found likely to be worth working, they are put into earthen pots (the usual water pots) with some earth and sand, and exposed to a fire for a day and night. At the end of the hot season they are sent down the *Nerbudda* by way of *Broach* to *Cambay*, to be cut and polished.

The cornelian mines are about four miles from *Rattanpúr* in a thick jungle. The people who work them return every night to *Rattanpúr*, there being no habitations near the mines. From the principal spot now working the following small hamlets are thus distanced.

Damláe, one mile south.

Ahmod, one and half mile north.

Padwana, 3 miles south-east.

To the eastward all is jungle.

The stones are said to be found over a space of about four miles.

The formation containing cornelians is a deep bed of red gravel, very like the London gravel: in it are found pebbles of various form and size, of the different species or varieties of chalcedony,—irregularly imbedded, and not in layers like flints in chalk.

The mines are usually sunk to about thirty feet, but on digging to sixty feet neither hard rock nor water is met with. I therefore conclude that this is a partial deposit entirely above the sandstone-conglomerate formation, which is denuded at the surface of the nullah before mentioned, which forms also the *Bawa Gorea* hill, and I believe the general range of the *Raj-píplas.*

As far as I could observe, there is no sign of organic remains in these gravel beds,—but every thing hereabouts should be examined carefully, as the building stones in several of the villages contain fossil shells; so that if the people could trace them to the quarries, it might lead to some interesting discoveries in the *Raj-pípla* range.

I saw no sign of this formation from *Broach* to the *Maihí* river, opposite *Cambay*, nor on the *Tankeria Bunder* side of the gulf.

The next point at which I found conglomerate rock was at *Gogo* in *Kattywár*, where masses of rock containing shells are dug out from the beach, the upper portions having been carried away by the encroachments of the sea.

This formation will, I hope, be soon traced up the south-eastern to the western coast of *Kattywár*. I before observed that the rocks at *Baunagar* are trap. Now these conglomerates appear to contain fragments of a great variety of mountain rocks, always excepting trap. This circumstance affords suspicion that the trap was thrown up subsequently to the deposit of the conglomerates. I say merely suspicion, as I know of no evidence of upheaving, nor the nature of the strata at the points of junction. These, between *Gogo* and *Baunogal*, are either obliterated by extensive degradation, or concealed by deposits of mud.

The island of *Perim* in the gulf of *Cambay*, afforded me a better opportunity of examining the conglomerate than the denuded beach of *Gogo*.

Perim is about three miles in circumference. About half the island, proceeding round the western side towards the southernmost point, consists of strata of conglomerate rock much acted upon, but forming cliffs in several parts to a height of about 30 feet above the sea, the upper strata being of compact sandstone,—all perfectly horizontal. The conglomerate contains shells and other fossils, some undoubted bones, &c. which have been forwarded for identification to *Calcutta*.

Fine sand,—partly from the decomposition of these rocks, but chiefly, perhaps, thrown up by the tides from the opposite coast,—appears to have been blown by the south-west monsoon, so as to form *dunes* of very singular aspect, mostly rounded at the top. In one place a sand hill has a quadrangular platform-like summit. These sand-mounts seem to have formed a barrier to the farther encroachments of the sea. There is a valley to the eastern side of the island partly in turf, and some part cultivated open to the sea, where one may walk with a firm footing, while the sandy *dunes* of the higher level give way in every direction.

Proceeding from the south point towards the eastward (the open valley), layers of kankar are met with *below* the sandstone,—beyond this is a low cliff of sand,—the valley completing the circuit.

In the hope that some of our members stationed in *Guzerat* will carry on the investigation of the fossils, not only of *Perim*, but of other parts of the formation in *Kattywár*, I have hastened to lay before them this imperfect sketch, without waiting for a report on the *nature of the fossils* found, or presuming myself to offer any opinion, or to draw a conclusion on that part of the subject.

II.—*Note on Mastodons of the Sewaliks.* *By* Capt. P. T. CAUTLEY, *Superintendent of the Doab Canal. Pl. XL.*

In the present state of the researches into the fossil remains of the Sewaliks, it will be interesting to note any discovery of peculiar interest, without entering upon a description in detail. Such a description may, with propriety, be reserved, until the possession of a more perfect and a more numerous collection of remains enables us to enter upon the description with greater confidence: whilst, in the mean time, to those who are interested in the study, the periodical announcement of progress made in our operations, cannot be devoid of interest; under this idea I did myself the pleasure of forwarding to your Society the note on the dentition of the *Mastodon Angustidens* (variety of), and now send you one on a skull of another variety of Mastodon which has been lately received. The sketches are drawn on transfer paper, and will, I hope, be intelligible.

Fig. 1 and 2, are representations of the fossil skull—Fig. 1 being the front, and Fig. 2, the profile or side view. Fig. 3 and 4, are similar outlines of the existing elephant, on a scale of one-eighth on linear measurement.

The fossil is exceedingly perfect in some respects. The left orbit and maxillaries are as sharp and well defined as in the recent skull; the frontal and nasals are tolerably perfect, the specimen is fractured obliquely, removing the temporal swellings and diploe of the cranium, together with the occipital condyles and foramen magnum; the curve of the occipital on its external surface is however retained, and although sutures are altogether wanting, and the alveoli of the tusks are mutilated, the specimen may be considered as sufficient to give a perfect idea of the form of skull; and, as a form perfectly unique amongst the proboscidean pachydermata, will be looked upon with satisfaction by all those who take interest in the additions that have of late years been so rapidly made to palæontology, and the catalogue of animals now no longer existing on the globe. The present skull derives additional interest from its being so different from the only type of the same genus or co-genus (for it may be permitted so to designate the elephant) which has been left to us—so different indeed, as to completely modify the construction of the head, and the arrangement of the muscular and fleshy matter that must have belonged to it.

Without entering into any minutiæ of detail on the peculiarities of the head, of which the drawings will give a representation, and which detail will be reserved until our collections enable us to bring under one view all the varieties of this genus that the Sewaliks may contain, it will be sufficient, in announcing this very interesting addition to our cabinet, to draw attention to a few leading points.

In the skull of the existing elephant, the excess of longitudinal measurement, over that in the contrary direction, owing to the great development of the superior portion of the cranium, is one of the most marked peculiarities of its form; the height from the external nasal opening to the top or apex of the cranium is immense, although undergoing modification from age; this excessive development not being derived from any increase of size to the cerebral cavity, but to a wide space composed of cellular bone or diploe, giving an external and deep covering to all that space occupied by the brain; the size of the orbit is small with comparison to the temporal region; the large external nasal aperture is situated between the orbits; and the front in the Indian species is slightly depressed:—now in turning to the fossil, we find that the whole of these peculiarities, are either reversed, or modified in an extraordinary degree.

The elevated and massive cranium does not exist, the slope towards the occipital and foramen magnum commencing from the top of the external nasal opening, and falling off to the rear in an abrupt angle; the size of the orbit is large, and its encircling bones massive and prominent; the space between the orbits to the front continued up to the nasal opening, is depressed to an enormous extent, and the two lines of alveoli of the tusks strongly marked; the temporal fossæ are comparatively small with those of the existing elephant, and the temporal bones; which although broken off in the specimen from which the drawing is taken, exists in another skull in our possession, appearing to be large and composed of cellular bone. The angle formed by the tusks with the grinding surface is more obtuse than in the existing elephant, and the form of head, instead of possessing the proportion assimilating the skull of the elephant to that of man, may be considered as nearly square, or perhaps possessing a breadth in greater proportion than the length. The height of the maxillary bones which is great in the elephant, is here much exaggerated, and the form and profile especially is so peculiar, that a glance at the sketch will, by comparison with that of the existing elephant also given, be sufficiently striking.

The suborbitary foramen is by no means large; the proportion of diploe in the upper part of the cranium bears no comparison with that in the existing elephant, these differences combined with the peculiarity of form and position of the external nasal aperture, may, in all probability, modify the extent to which this variety of Mastodon was provided with trunk; but to forbear from surmises or speculations in the present imperfect state of the inquiry, it will be sufficient to place this as a second to the *angustidens* formerly noted.

P. S.—A letter this moment received from Captain Cautley announces the discovery of a superb specimen of the *Mastodon angustidens*, a skull with both lines of molars, palate, and one orbit entire: he adds—"We have much still to learn of these *Mastodons;* with regard to the *Mastodon elephantoides* of Clift, there are evidently two species, of the same character as to dentition, but with a remarkable difference in the form of cranium, one of which has the flat and the other the elevated crown." A very perfect head of a horse has also just been extracted by the *Sewalik* working parties, from the hard sandstone.—Ed.

III.—*Additions to the Ornithology of Népal. By* B. H. Hodgson, *Esq.*

1. *Indication of a new Genus of Insessorial Birds.*

Conirostres, *Sturnidæ, Lamprotorninæ ?* Dentirostres, *Merulidæ, Crateropodinæ ?*

In the suite of specimens of Nipalese birds forwarded by me, three years ago, to the Zoological Society of London, were three or four of the subject of the present article. They were marked in the imperfect list obligingly returned to me as "a new form nearly allied to *Pastor*." But, if *Pastor roseus* be the type of that genus, I confess I cannot perceive much affinity with our bird, either in structure or in manners. And, if a strong, arched, solid and compressed bill, united with gradated wings, and very strong feet, be *the* marks of the *Crateropodinæ*, to that sub-family, I conceive that our bird should be referred; the more especially as its shy and retiring habits are alien to those of the whole *Corvidæ*, and in a yet more particular manner, to those of the Sturnine branch of it. The Indian *Stares* seem to have perplexed systematists most wofully, though, I fancy, there is not one of us exiles 'in the land of the sun,' but readily recognises the propriety of the *native* genus *Maina.* All the *Mainas*[*] have a preponderant similitude of general structure and of habits, constituting generic unity, if such a thing there be; and placing these birds, in a natural system, close to the European genus *Sturnus* (secundum Linnæum); unless indeed that single genus should not rather embrace the whole of the *Mainas* sub-generically. Yet, according to the latest and most accredited systems, these birds are scattered at random amongst the *Lamprotorninæ,* the *Pastorinæ* and the *Coracianæ,* constituting the Sturnine genera *Dilophus, Acridotheres,* and *Pastor,* and the *Corvine* genus *Gracula vel Eulabes!* Should we feel disposed to turn from English to French systems, the matter is no way mended: for CUVIER's *Dentirostral* and *Meruline Grakles* are sundered, toto cælo, from his *Conirostral* and *Corvine Stares;* and TEMMINCK's *type* of the genus *Pastor* is dissevered widely from all its congeners! If the first men of the age can so err for want of local information[†], it is to be hoped that some of them will, ere long, see the necessity of *methodical co-operation* with those who are capable of supplying that information, and who, I will add, are most anxious to supply it, upon fair and gentlemanly terms of participation.

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[*] We have seven species, all abundant in Nipal.

1. Religiosa.
2. Cristelloides, (nob.)
3. Tristoïdes, (nob.)
4. Sylvestris, (nob.)
5. Affinis, (nob.)
6. Communis, (nob.)
7. Terricolor, (nob.)

Of these, 2 and 3 are very nearly allied to Cristatella and Tristis; 4 and 5 to Pagodorum and Malabarica. The 6th inclines much to Sturnus; and the 7th, a very osculant species, has very considerable resemblance in the form of its wings, tail and legs, to Cinclosoma.

[†] So subtile and various are the relations of birds to one another, that no success can attend the ambitious project of a *general* classification conformable to nature, unless, to the intimations derived from external structure be added those derivable from internal structure and from habits and manners.

But how shall the most able man of science at home procure an adequate supply of the latter sort of information, unless he will associate to himself some intelligent and persevering local students? Dried skins are but dried skins! And why have we Zoological Societies, unprovided with travelling naturalists, if not to accomplish *some sort* of adequate union between domestic skill and foreign opportunity?

So long as the closet and field departments continue separated, so long will the multiplication of idle names and vague species go on, whilst no effectual progress will be made in the noble attempt at a natural classification.

What adds to my difficulty in attempting to class the birds now in question is, that the so-called *Pastor Traillii* (very abundant in Nepal) is, in my judgment, a typical Oriole; whilst the *Lamprotornis spilopterus* (also common here) is not easily referable to Temminck's genus *Lamprotornis*.

Mr. Swainson, who has very recently revised the *Sturnidæ* of our modern English school, characterises the sub-typical or *Lamprotornine* group of them thus. "Bill more compressed and thrush-like, its base not angulated; the tip of the upper mandible distinctly notched." In the above characters I perceive some faint traces of our bird: but when I turn to the indication of the entire family, those traces seem obliterated, for "the conic straight bill, naked nostrils, and lengthened pointed wings," of the *Sturnidæ*, essentially *conflict* with the structure of our subject.

With these preliminary remarks I shall now attempt to characterise our bird, as the type of a new genus or sub-genus, either of the *Lamprotorninæ* or of the *Crateropodinæ*, as the learned shall please.

Cútia nobis. *Khutya* (quasi *Pedatus)* of the Nipalese.

Bill equal to the head, at base higher than broad, sub-arched and much compressed throughout; strong, entire*, obtuse. Culmen considerably carinated between the nares, but not much produced among the soft and simple frontal plumes. Tomiæ erect, rather obtuse, and near to the palate. Nares broad-lunate, sub-basal closed above by a nude un-arched scale. Rictus moderate, smooth. Orbits and head plumose. Wings short, but firm; 5th quill usually longest; 2 first strongly—2 next, slightly gradated up to it. Tail short, quadrate and firm. Tarsi sub-elevate, very strong, nearly smooth. Toes compressed and ambulatory; lateral fores unequal, connected basally, the outer one as far as the joint; central not elongated; hind very large, sub-depressed and exceeding either of the lateral fores. Nails, compressed, strong, moderately bent, rather blunt†.

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* Entire in the majority of my full grown specimens, but in others there is a faint notch. This liability to vary perpetually occurs in Cinclus, in Cinclosoma, in Cuculus, and in Timalia (not to mention more); rendering the task of characterising *justly*, a work of time and labour in comparisons.

† So soon as the family and sub-family of our genus be determined, a great part of the above generic definition may be omitted relatively to such determination. At present the larger divisions sadly outrun the characters which should accompany and designate them. Vide Shaw's General Zoology, vols. 13 and 14, where few of the larger divisions have any characters attached to them. Vide also the Regne Animal, Aves. wherein the subdivisions are indicated, *passim*, by two or three vague words!

Type *Cútia Nipalensis*, nobis.

Nos. 254, 255, of the new specimens and drawings in the possession of the Zoological Society. In order to illustrate the affinities of our bird, I proceed to compare it with *Pastor roseus* and with *Lamprotornis spilopterus*.

In *Pastor roseus* (as in all the typical *Pastors* in my possession) the bill is longer than the head, straight, conico-cylindric, and soft and feeble towards the base. Its gape is angulated; and the plumes of the head, carried forwards to the anteal extremity of the oval nares, are pointed, glossed, and elongated. The ample and pointed wings, have the 1st quill bastard; the 2nd, very long and nearly equal to the 3rd, which is always the longest. The tarsi are strong, elevated and heavily scaled. The toes have the laterals and hind equal, and the central fore considerably elongated. The outer fore toe has a basal connexion with the central, but the inner is free.

In *Lamprotornis spilopterus* the wings have exactly the same form as in *Pastor roseus*; and, as this identical form is also found in *Eulabes religiosa*, (not to mention more typical *Pastors*,) it would seem to be characteristically and extensively significant[*]. The bill of *Lamp. spilopterus*, which is scarcely longer than the head, uniformly sub-arcuated and not angulated at the gape, *so far* agrees with our *Cútia*. But its base is distinctly depressed, whilst forward it has a very slight compression and sub-cylindric outline. It is, besides, *sharply* pointed, *saliently* notched, and its trenchant fine tomiæ are *deeply interlocked.*[*] Carry these peculiarities a little further and you have the bill of *Chloropsis*, which genus further agrees with *Lamprotornis spilopterus* almost entirely in the nature of the food of the species, and in the structure of their stomachs. On the other hand, the harder, blunter, more solid, and uniformly compressed bill of *Cútia*, associated as it is with a subtriturating stomach and a diet consisting of hard insects and seeds, seems to affine our bird to *Pomatorhinus* and its allies.

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[*] The generic character of Pastor gives 'remex prima longissima:' but it is not so in my specimen of the type or *Roseus*: nor in any other typical *Pastor*, if Pastor be the equivalent for *Maina*. On the other hand, if *Acridotheres* be held to be that equivalent, the 'genæ plus minusve nudæ' is true of *Tristoïdes*, not true of *Cristelloides*, which two species are, however, as nearly allied as possible and perpetually associate together, every large flock of the former having many individuals of the latter. In other words, these genera are artificial and false; neither of them being capable of comprising consistently half a dozen of the most similar birds. The cheek piece *cannot* be an influential character, or one of the above named two species would not have it, and the other want it. By consequence, I should say, the genus *Eulabes* is purely artificial; for, bating the cheek piece, there is nothing left to distinguish the single species ranged under it, but a greater degree of thickness in a bill of exactly the same essential character.

Commend me to the *old* genus *Gracula*, sub-generically divided.

Our *Maina* is the prototype of the French *Martin* and of the English *Minar*.

In *Lamprotornis spilopterus* the nares are still short and round, though there be somewhat more approach to a nude membranous tect than in *Pastor roseus*.

In *Lamprotornis spilopterus* the tarsi are rather low, and the feet suited more to perching than to walking, the soles being flattish and the nails very acute. The lateral fores (of which the outer one only has a basal connexion) are shorter in proportion to the central, and longer in relation to the hind, than in our bird, which, by its longer legs, and full soled stout toes, provided with straighter and blunter nails, proclaims its more terrestrial habits, notwithstanding the basal connexion of the fore toes. Lastly, the pointed and burnished feathers upon the head of *Spilopterus* are wholly wanting in our bird.

In *Spilopterus* they seem to intimate relationship with the *Stares:* nor is the intimation unrequired; for the habits and essential structure of this species*, when viewed in relation to whatever hath been, or can be justly, alleged of the *Sturnidæ*, savour more of contrast than of similitude. As for our *Cútia*, amidst all its anomalies (so to speak) of external structure, there is certainly something *Sturnine* in its aspect; and, by the formation of its feet and wings, as well as by its variegated plumage, it bears some resemblance to *Sturnella;* a genus "leading directly to the true starlings."

Species new. *Nipalensis* nobis. *Nipalese Cútia,* nobis.

Habitat, central and northern regions: adheres to the wilds, and feeds on hard seeds and hard ground insects.

Colour and Size. Male. Above, brilliant rusty yellow, with jet black remiges and rectrices: cap, and a large apert central portion of the wings, slaty; the former, confined all round by a black band proceeding through the eyes and ears from the nares. Below, from chin to legs pure white, from legs inclusively to tail, flavescent: the flanks broadly cross-barred with black: a spot of the sâme hue at the base of the maxilla: most of the quills and the lateral rectrices, tipped with white: lining of the wings and quills internally towards their bases, albescent: bill above blackish, below plumbeous: legs orange yellow: iris brown, 7 inches long by 11 wide, and 2 oz. in weight: bill $\frac{14}{16}$: tarsus $1\frac{3}{16}$: central toe $\frac{12}{16}$: hind toe $\frac{10}{16}$. The female is a trifle less in size: her mantle is variegated by longitudinal black drops; and her cheek-band is brown instead of black.

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* Quod est, structure of the chylopoetic viscera of the bill, and of the tongue, taken collectively.

In all these respects there is a strong tendency towards Ixos, Chloropsis, Hypsipetes, and others of the frugivorous arboreal and short-legged section of those most anomalous thrushes, the other or long-legged division of which seem to make some such approximation to the Conirostres, as the short-legged section does to the Tenuirostres. Cuvier's Philedones, of which our Sibia may be taken as a perfect type—appear to unite these two very opposite sections. Sibia Picaoides has the tail and feet of Pica; and the bill and tongue of Chloropsis! But these are mysteries for the amply stored Museum and Library to solve!

2. *Indication of a new Genus of Waders, belonging to the Charadriatic Family.*

Most Indian sportsmen are aware that there are two species of wader, known to the natives by the common name of *Carvának* or *Carbának;* one of which frequents dry sandy plains, and the other, sandy banks of rivers.

The former bird belongs to the genus *Œdicnemus* or *Thick-knee,* scarcely differing, as a variety, from the European type of that genus. But the latter, though possessing the same figure (even to the large head, with abrupt elevated forehead and great staring eye), as the other; and though, moreover, resembling the other strictly in the form of the legs, wings and tail, yet differs from it *totally* in the structure of the bill.

This member, which in *Œdicnemus* has very much of the *Plover* form, in the river-haunting *Carvának* exhibits the strength and size so conspicuous in the *Storks* and *Jabirus.*

I find no generic mention of such a form in the works of Ornithology accessible to me; and I therefore propose to characterise it as a new genus; subject to the correction of those whose access to libraries and museums qualifies them to lay down the law in matters of this sort.

Order Grallatores. Family Charadriadæ. Genus *Carvánaca,* nobis.

Character.

Bill twice as long as the head, sub-recurved, strong, convex above, considerably compressed; the base thickish and rounded; the tomiæ very trenchant, locked, and denticulated and notched towards the tip, as in *Ardea.* Nares broad-linear and placed forward in a wide membranous fosse, extending $\frac{1}{3}$ from the base to the tip of the culmen. Tongue long, narrow, fleshy: towards the point cartilaginous, and the point itself sub-bifid. Form of the head and body, of the feet, wings and tail, as in *Œdicnemus.*

Type *Carvánaca Grisea,* nobis. *Œdicnemus Magnirostris,* Hardwickii?

Specific character.

Carvánac. Above, a sky grey: below, together with the frontal zone, white. Brows, ear-coverts and mustaches, blackish. Shoulders, false wing, and coverts next them, together with the quills and tip of the tail, blackish. Wings and tail irregularly but largely banded with white, and both white for the most part, below. Length of the bird 20 inches, width 36, weight 1¼ lbs.

The marks. This species inhabits the Bengal Presidency, very generally, being always found on the wide sandy banks of the larger rivers during the cold months of the year. It migrates to Tibet in summer, and passes over Népal on its way to and fro. Its food consists of crabs and other hard-shelled fish. Its intestines are from 22 to 25 inches long, with two cæca, each 3¼ inches, placed at 5 inches from the lower end of the gut. The stomach is a strong triturating gizzard, fitted with the aid of gravel, to grind the hard parts of the bird's food.

Manners cannot well be more dissimilar than those of the desert and ripuary *Carvánacs:* the former adhering to dry arid plains, very much like the Indian Bustards*; and the latter, as exclusively to the beds of rivers. Whoever will refer to the English CUVIER, (Aves. III. 307,) will perceive that our *species* is probably not unknown to science. Is it not the *Œdicnemus Magnirostris* of Hardwicke?

At the place quoted, two other allied species are cited, and these three may constitute the new genus or sub-genus *Carvánaca,* distinguished from *Œdicnemus* by totally different manners, and by a truly cultirostral bill.

It were well, indeed, if all new genera rested on diversities so marked as these—the manners so admirably tallying with the structure of that grand instrument of sustentation, the rostrum. Our genus, moreover, appears to me to constitute a remarkable and distinct link of connexion between the *Ardeidæ,* by means of *Mycteria* and the *Charadriadæ* through *Œdicnemus.* And it would, in my judgment, be quite as consonant to nature to confound *Œdicnemus* with *Charadrius,* as *Carvánaca* (nobis) with *Œdicnemus.*

The only consequence of HARDWICKE's species proving to be the same with ours, ought therefore to be—not the rejection of the new genus, but—the merging of my specific name of *Grisea* in his of *Magnirostris:* unless indeed, the latter term be not held to have lost its significance in relation to a genus as much distinguished for the strength and size of the bill, as any one of the *whole order.*

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* It is frequently called by us the Bastard Florican.

3.—*Indication of a new Genus of the Falconidæ.*

FALCONINÆ, Vigors. Genus new. *Báza,* nobis.

Generic character. Bill as in *Ierax,* but somewhat longer: upper mandible, with two sharp teeth on either side the hook, directed forwards: lower mandible with three or four smaller ones, on each side, correspondent to the former. Nares transverse, long, and linear, with the cere behind them membranous and free to base of bill. Legs and feet short and thick. Tarsi low, half plumed, coarsely reticulate. Toes short, cleft, inner fore and hind somewhat depressed and the latter large. Aeropodia wholly reticulate. Talons sub-equal, acute, squared below.

Wings long, equal to tail: 3rd quill longest.

Type. *Báza Syáma,* nobis.

In addition to the above significant particulars, (some of which may hereafter be omitted in the generic character,) I may add that the orbits, lore, and sides of the cere are clad in soft, composed plumage; that the cere is short and nude above; that the bill has great breadth and depth at the base, corresponding with the broad flat head and large eye of the true *Falcons,* and, both of which distinguish our bird no less; that the first and second quills are but moderately gradated*, and all three pretty sharply emarginated towards their tips, though not so near as in *Falco* or in *Ierax;* that the tail is of medial length and square; that the tongue is bifid; and that, lastly, the feeble feet are remarkable for the sub-equality of the toes and talons, the roughness and levelness of the soles, and the size and depression of the thumbs. The complex affinities of this singular genus are obviously with *Cymindis, Harpagus* and *Ierax.* It is more nearly allied to the last, and its position (in VIGORS' arrangement of the *Falconidæ*) clearly is at the head of the *Falconinæ,* and leading from the genus *Gampsonix* to the genus *Ierax.* It differs from *Ierax* by its cymindian nares, its long wings, and its cleft toes, with unballed and depressed soles.

Species new. *Báza Syáma,* nobis.

Black, glossed with changeable blue or green: the belly and sides, rufous white, crossed by five or six broad bars of lake tinged ochreous red: outer web of the secondaries, the same hue—of the tertials, white: scapulars and long coverts nearest them, whitened internally: a broad white gorget on the breast: remiges and rectrices plumbeous, for the most part, on the lower surface: legs and bill plumbeous: talons and tip of the bill, black: iris brown: a long slender drooping crest from the occiput: 13 inches long by 30 wide and 7 to 8 oz. in weight: bill, $\frac{14}{16}$: tarsus, $1\frac{2}{16}$: central toe, 1.

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* 1st is 1½ inches, and the 2nd ½ an inch, less the 3rd: the rest rapidly fall off; and the primaries exceed the tertiaries by nearly three inches. The scapulars are of good length.

Remarks. These birds are peculiar to the great forests of the *lower region*, so far as I yet know. The sexes are alike both in size and colours: both in young and moulting birds the leaden colour of the legs is lost in fleshy grey—that of the bill, in dusky grey; and the powerful complex dentation of the bill, (both mandibles) is in the juniors only traceable as a festoon upon the upper mandible.

4.—*Indication of a new Genus of the Picidæ, with description of the type. A new species, also, of two new species of the Genus Sitta.*

Yunxinæ, Swainson. Genus new; *Sasia*, nobis. *Sasya* of Nipal.

Generic character.

Bill equal to the head, conico-compressed, pointed and entire: the base furnished with tufts of hair as in *Bucco*.

Nares round, basal, lateral, remote, and concealed. Tail short, soft and square; wings equal to the tail, full, soft, first quill sub-bastard, 5 and 6, longest and equal; tertials sub-equal to primaries.

Feet three-toed, hind toe stoutest, sub-equal in length to outer fore; inner fore connected to first joint. Nails somewhat straightened and obtuse.

Tongue as in *Picus*.

Type, *Sasia ochracea*, nobis.

Species new. *Ochracea*; *Ochreous* red *Sasia*.

Form. It has been described above. In further illustration of it we may, however, add that this singular bird has a close relationship with our *Vivia*, from which it differs by its rather longer and *perfectly unangulated* bill; by its shorter, even tail; by the *Bucco*-like tufts of its bill; and, above all, by its three-toed feet, the nails of which have hardly any of the scansorial falcation and acuteness. Its orbits are nude, and it has a transverse corneous opercule *before* the eye.

Colour and *Size*. Subochreous red, with greenish yellow cap and wings; a white streak from behind each eye; and jet black unmarked tail.

Wings, internally, dusky; on their lower surface towards the bases of the quills, as well as the lining of the wings, buff. Legs fleshy yellow: bill plumbeous with a dusky ridge: orbitar skin plumbeous: iris brown: size very minute, $3\frac{1}{2}$ inches by 7, and $\frac{1}{3}$ oz. in weight;

tarsus $\frac{10}{16}$: anteal outer toe $\frac{8}{16}$: its nail $\frac{5}{16}$: sexes alike: Habitat, forests of lower region.

Remarks. On a recent occasion I quoted *Vivia Nipalensis,* (nobis) as the smallest of the family*. The above singular bird is still smaller, and both by its extraordinary form, and by its diminutive size, confirms the assertion then hazarded, that the vast forests of Nipal yield to none in the world in the number and variety of the Woodpecker tribe.

CERTHIADÆ. Genus *Sitta* auctorum. Species new ; *Corallina,* coral-billed *Sitta,* nobis.

Form, as in *Castaneoventris*†, but considerably smaller in size. Above, soft sub-cerulean blue, tinged with lilac on the cap : below, sordid greyish : chin white : forehead black : great quills and lateral rectrices, blackish ; the latter, white-tipped : legs plumbeous grey : bill intense coral red ; iris straw yellow : 4¾ inches long by 8½ wide, and ½ oz. in weight : sexes alike. Habitat, central and northern regions.

.Species 2nd, *Nipalensis,* nobis.

Above, saturate blue, darker than in *Castaneoventris* and with a purplish tinge ; below, rufescent deepening as you descend the body, and showing full rusty on the lower flanks, vent, and inferior tail coverts : from the nostrils through the eyes to the shoulders, a black band : quills and lateral tail feathers, blackish : a white spot at the base of the two central rectrices ; and the lateral ones blanched towards their tips : legs fleshy grey : bill dusky blue, changing to fleshy grey towards the base : iris dark brown : sexes alike : size of the precedent, and habitat the same.

5.—*New species of Hirundinidæ.*

CYPSELUS. *Chætura.*

Species 1st. *Nudipes,* nobis.

Form and size. Bill typically cypseline with large vertical nares, wings exceedingly firm and long ; 1st quill longest, more than two inches beyond the tail : tail shortish, quadrate, longer than the coverts, composed of ten very firm square-pointed feathers, the rigid straight shafts of which are produced into naked acute spines. Tarsi longer than any toe, nude, smooth. Toes longer and more unequal than in *Cypselus,* with the hind one distinctly versatile. Talons strong and scansorial; 8½ inches from tip of bill to tip of tail, and 20 inches between the wings. Weight 4½ oz. Tarsus $\frac{11}{12}$, central toe $\frac{9}{12}$. Colour, head as far as the eyes and ears (inclusive), dorsal neck, sides, rump, upper tail coverts, wings and tail, dusky-black with a changeable blue or green gloss: chin, throat, and most part of the neck in front, confluently white: bottom of the neck, on the anteal surface, breast, and body below, sooty brown: vent, inferior tail-coverts, and a lateral stripe from the thighs, backwards to them, white, more or less picked out with blue glossed black: back and scapulars, whitey-brown: inner web of the last tertiaries, pure white: legs purpurescent dusky: bill black: iris dark-brown: sexes alike. The young want the blue or green gloss of maturity: the clear whitey-brown of the back and pure sooty brown of the belly are in them blended into an uniform dusky hue; and their throat is of a very sordid white.

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* A mistake, I find : for *Picus Minutus* is but 3½ inches long, or, precisely the size of our present subject.

† Also a Nipalese species : and these hills have therefore afforded three species to a genus previously limited to one—or, at most, two, if *Pectoralis* prove to be distinct.

Remark. This singular species, by the structure of its feet, opens a passage from *Hirundo* to *Cypselus.* Though variously allied to *Pelasgia, Acuta, Caudacuta, and Gigantea,* it exhibits, I believe, a distinct type of form—being certainly not a *Chætura* as defined by Stevens, nor a *Cypselus* of Illiger; far less a swallow. It climbs with great power aided equally by its talons and its tail. Its habitat is the northern region, whence it sometimes wanders into the mountains of the central, avoiding however the open and level country. I have set it down in my note book as the type of a new genus, called *Hirund-apus.*

Species 2nd. *Cypselus Nipalensis,* nobis.

Sooty black, glossed with green: chin, throat, and top of the neck in front, confluently white: a white bar across the rump: talons and bill, black: iris brown: nude part of toes, dusky-grey. Size small; 5½ by 12½ inches; and barely one oz. in weight: sexes alike: structure typical: tail, short and even.

Remark. This is the common Swift of the central region, where it remains all the year, building under thatched roofs, and against the beams of flat roofs. It lays two white eggs and breeds repeatedly.

Genus *Hirundo.* Species 1st. *Nipalensis,* nobis.

Cap, back, scapulars and wing-coverts, brilliant deep blue: quills, tail feathers, and the longer tail coverts above and below, dusky: a narrow frontal zone, cheeks, neck, and body below, as well as the rump and lesser tail coverts above, rusty; paler and striped with narrow lines of dusky hue on the whole abdominal surface: dorsal neck, more or less blotched with blue; rump, immaculate : bill, black : iris, dull brown : legs, fleshy-grey : sexes exactly alike : structure typical : tail long and deeply forked : size of *H. Rustica.*

Remark. This is the common *Swallow* of the central region, a household creature remaining with us for seven or eight months of the year.

Species 2nd. *Rupicola,* nobis.

Earthy grey brown : below, from the chin to the vent (exclusively), rufescent white : legs fleshy grey : bill black : iris brown : sexes alike : larger than the last, 6½ by 14½ inches, and weight 1½ oz. : structure typical : wings exceeding the short and subfurcate tail. Habitat, the central and northern regions : not migratory : adheres to the mountains, preferring rocky situations.

N. B. The remaining Hirundine birds of *Népal* are *Hirundo Rustica* and the Sand-Martin ; both of which, but especially the latter, are common.

IV.—*Description of the Shell and Animal of Nematura, a new Genus of Mollusca, inhabiting situations subject to alternations of fresh and brackish water.* By W. H. Benson, *Esq. B. C. S.*

Animal.—Caput tentaculis duobus setaceis oculis posticè prope bases tentaculorum sessilibus ; proboscide elongatâ, cylindraceâ, extensili.

Pes ovato-oblongus, medio ventricosus, posticè angustatus, acuminatus, processu brevi filiformi subito desinens ; anticè expansus, medio profundè emarginatus ; alâ utroque latere porrectâ latè angustatâ, acuminatâ.

Testâ ovatâ, ventricosâ, à latere compressâ, ultimo anfractu insuper aperturam angulato, deflexo. Aperturâ integrâ constrictâ, orbiculari, suprà vix angulatâ ; peritremate acuto leviter intus incrassato. Operculo tenui in spiram planam convoluto.

The snout is capable of great extension, and the animal is able to lick the summit of the shell with its extremity, which is armed within the mouth with a pair of strong vertical jaws, each apparently consisting of two pieces : these are constantly in motion in a vertical direction. The centre of the foot has a rounded peltate appearance, occasioned by the adaptation of its form to that of the operculum, which is visible through the transparent foot when viewed on the under side. The singular short filiform process attached to the extremity of the foot appears to be the termination of a nerve or minute canal, which is seen extending directly up the centre of the foot until it is lost under the operculum. The excrement is voided from the right side of the animal.

The shell is compressed laterally in a direction parallel to the axis and to the plane of the aperture, as in *scarabus*, but the prominent edges are rounded, and the former lips do not leave a ridge or keel at each semi-turn as in that genus. The sudden deflexion of the last whorl above the aperture, and the consequent depression and constriction of the aperture is a singular feature in the shell, and, in conjunction with its compressed form, led to my pronouncing the species to be a type of a distinct genus before I became acquainted with the animal or the operculum.

The first specimens which I saw, were shewn to me by Mr. Cracroft, who found them destitute of inhabitant or operculum in the *Sunderbans* east of the *Jabuna* river. He was unable to state whether they were land or water shells. Their occurrence in the delta of the Ganges so near to *Calcutta*, spurred me to diligence in the search after the species, and, about a couple of months subsequently, I discovered it alive between high and low water mark in pools, and on wet mud recently left by the tide in the river *Hooghly*, immediately opposite to the Esplanade. Here they were accompanied by *Melania lirata** and *Melania pyramis**. Dr. Pearson subsequently found them in the mud deposited by the aqueduct which passes in front of the Town Hall. Here we found them accompanied by assiminia fasciata, and by small specimens of novaculina gangetica. I also took specimens attached to a floating bamboo in the Salt-water Lake in company with *Neritina depressa*.

Though found between high and low water mark like assiminia fasciata, nematura does not otherwise resemble it in its habits, as it never attempts to creep out of the water in which it is placed, but ascending to the surface swims with the foot reversed in the same manner as *lymnæa, planorbis, paludina,* and the smaller *melania* use to do.

I have named the species on which the genus is founded

Nematura† *Deltæ*. Testâ ovato-conicâ, à lateribus tumidâ, lutescente, ultimo anfractu ventricoso, majori omnibus obliquè minutè striatis; spirâ brevi; apice acuto; umbilico evanescente. Long. 0.25 poll.

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* *Melania lirata*, described as species D, and *melania pyramis* as species B, in *Gleanings in Science*, vol. ii. p. 22. Species A of that paper, I have elsewhere more fully described as *M. variabilis*, and I have named species C *M. elegans*.

† Lamarck has a genus of insects named *Nemoura* from *νῆμα* filum and *οὐρὰ* canda; but as he neglected the rules of composition the appellation of the present genus, while it expresses a singular feature in the animal, will run no risk of being confounded with that of the eminent naturalist.

V.—*Note on the Genus Pterocyclos of Mr.* Benson *and Spiraculum of Mr.* Pearson. *By Dr.* William Bland.

On the 27th of May last, I was fortunate enough to fall in with a shell of this genus, on the islet of *Susson*, one of the *Boontin* group, opposite to the peak of *Queda*, and in sight of *Pulo-Pinang*. Although the general description of my specimen answers to those above-mentioned, yet in some particulars it differs from both. The mouth is circular, its upper half marked inside by a double slightly raised line, from whence the pterygoid process is sent off which overhangs and forms the sinus, but the inside edge of this process does not touch the penultimate whorl as in Mr. Benson's shell, and it certainly differs from those of Mr. Pearson. In the specimen of *Pulo-Susson*, the sinus is $\frac{1}{10}$ of an inch from the rings above-mentioned to the outside arch, and from this arch to the extremity of the wing which overhangs and forms the sinus is $\frac{3}{10}$ th of an inch; the wing in breadth is $\frac{6}{10}$ th, mouth thickened, which thickening is carried on to strengthen the wing on its upper part. Shell one inch in diameter, with dark orange zig-zag lines across the whorls, and a band of a darker colour running longitudinally on the centre of the last whorl. Animal recently dead, but in a state of decay, so that nothing could be made out of it.

As one drawing is worth many descriptions, I have cut a leaf out of my book, having two figures of the natural size of the shell in question, No. 1, for your inspection; and, to assist in elucidating the history of this genus of beautiful shells, I have added another figure, No. 2, found at *Trincomalee.*

This shell has a small pterygoid process bending down, and in contact with the penultimate whorl, extending $\frac{1}{8}$th of an inch in front of the circular mouth, but no vestige of tube or sinus obtains in this specimen; lip thickened and reflected; the shell having all the appearance of maturity; diameter $\frac{7}{10}$ th of an inch: operculum convex, horny-formed, of circular layers.

Note on Dr. Bland's *Paper.*

The *Susson* species appears, from the drawing forwarded with the description, to belong to the typical group of *Pterocyclos*, which includes *P. parvus* and *rupestris*, and to be intermediate between the latter species and *hispidus*, to the last of which it exhibits an approach in the irregular aperture and dilated and thickened wing; but in the absence of a specimen for comparison, no specific character can be assigned with safety.

The *Trincomalee* shell is interesting as an arborant form, indicating the passage to *Cyclostoma*, which it approaches through the alate species, *C. petiocrianum* of Gray. It appears to possess the convex *operculum* composed of spirally concentric and exserted laminæ which characterizes the typical species of *pterocyclos*. This character seems to be gradually developed in the opercula of the *Cyclostomodæ* as the umbilicus widens, and the shell becomes more discoid; varying from the flat operculum of *C. elegans* through that of *C. involvulus*, where the edges of the laminæ are partially disengaged, and that of *C. termistriatum*, which is thickened and shews a strong spiral keel, to the convex and spirally laminar structure of the *pterocycloid* group.

The species of *Cyclostoma* from *Neemuch*, described by Lieutenant Hutton as No. 26, in page 520, vol. iii. J. A. S. I have ascertained by a comparison of specimens to be *C. semistriatum* of Sowerby, whose examples were procured from *Poona*.

Query. May not the impression of a supposed species of *Cirrus* noticed in Dr. Ward's paper on the geology of the Elephant Rock in the *Queda* country, printed in the second part Trans. Phys. Class, p. 166, be that of one of Dr. Bland's species of *Pterocyclos* from *Pulo-Susson?* A reference to the specimen No. 4 will decide.

VI.—*Note on the Nautical Instruments of the Arabs. By* James Prinsep, *Sec.*

Since the arrival of the Arab vessels which annually frequent the port of *Calcutta*, I have made diligent inquiries concerning the instrument in use among them for the measurement of the latitude, in hopes of elucidating thereby the Baron Von Hammer's translation of the "*Mohit*" (see p. 442). I have been hitherto unsuccessful, the English quadrant or sextant having generally superseded the more ancient and clumsy apparatus. One *Muallim*, however, seemed to recognize the instrument perfectly by my description, though he could not explain its construction; and promised to bring me one on his next voyage:—he stretched out his arms, when I inquired about the *issabah* division, and placing his fingers together horizontally, counted with them the height of the polar star, just as I guessed must have been the early and rude method of the Arab navigators.

At length in a vessel from the *Maldive* islands I met with an intelligent navigator who brought me the primitive instruments with which he was accustomed to work his way to *Calcutta*,—and as I do not think they are generally known, while it is certain they are of Arabic origin, I hasten to describe them as lithographed in Plate XLVIII.

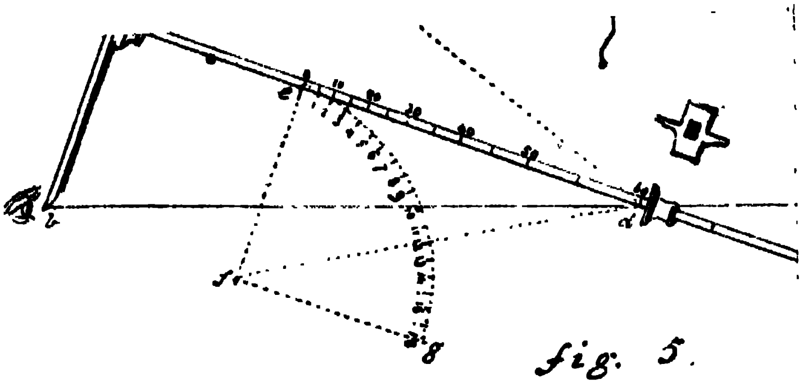
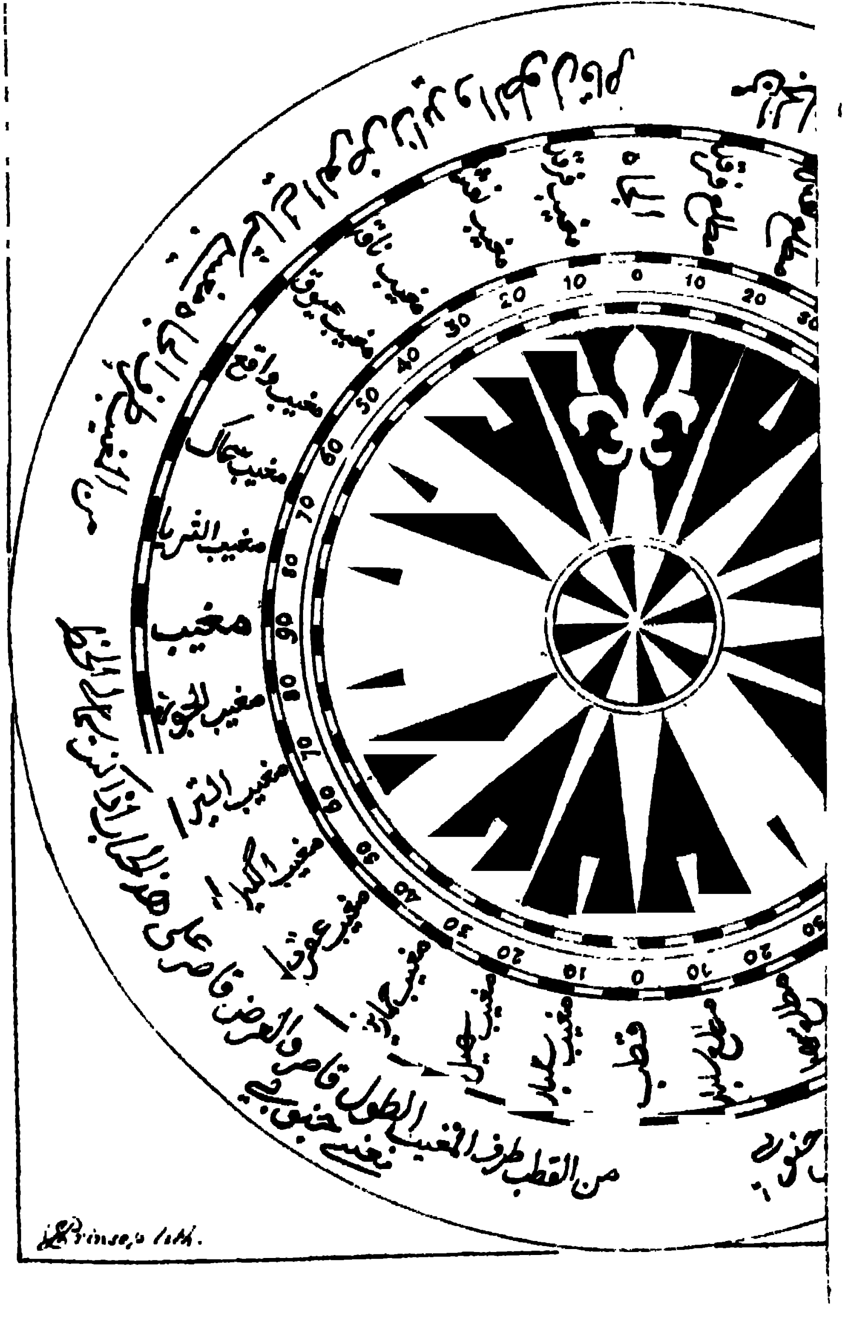


fig: 5.



J. Prinsep lith.

Fig. 1. is the كمال *kamál*, an instrument for taking the altitude of the polar and circumpolar stars*, in its most elementary shape.

It consists of a small parallelogram of horn (about two inches by one) with a string (or a couple of strings, in some instances), inserted in the centre. On the string are nine knots. To use the instrument for taking the height of *polaris*, the string is held between the teeth, with the horn at such a distance from the eye, that while the lower edge seems to touch the oceanic horizon, the upper edge just meets the star: the division or knot is then read off as the required latitude.

The mode of marking off these knots is curious. Five times the length of the horn is first taken, as unity, and divided into twelve parts: then at the distance of six of these parts from the horn, the first knot is made which is called " 12." Again the unit is divided into eleven parts, and six of these being measured on the string from the horn as before, the second knot is tied and denominated " 11." The unit is thus successively divided into 10, 9, 8, 7, and 6 parts, when the knot tied will of course exactly meet the original point of five diameters: this point is numbered " 6." Beyond it one diameter of the horn is laid off for the " 5" division, and one and a half again beyond that for the " 4" division, which usually terminates the scale.

It is easy to determine by calculation the value of these several divisions, measured from the centre of the horn or diameter *b d*, and at right angles to it. They represent the tangents of the angle *c b a*, to radius *b c*, or cotangents to the complementary angle *e b a*: but *e b a* is equal to *b a c*, which is half of *d a b*, therefore the divisions represent cotangents of half the angle of observation. To judge then of their actual value, expressed in altitude, we have but to convert their numerical ratio to radius, by a table of natural cotangents, into degrees and minutes; and to take the double as the latitude in each case: thus, the horn being equal to double radius *b c*, we have

					Lat.	Diff.
The first division, No.	12	= $\overline{2 \times 5 \div 12} \times 6$ =	5.00	Cotng. of half angle. =	22°38	
	11	10 ÷ 11 × 6	5.45		20 46	1° 52′
	10	10 ÷ 10 × 6	6.00		18 54	52
	9	10 ÷ 9 × 6	6.66		17 4	50
	8	10 ÷ 8 × 6	7.50		15 12	63
	7	10 ÷ 7 × 6	8.57		13 18	53
	6	10 ÷ 6 × 6	10.00		11 24	54
	5	10 + 2	12.00		9 32	52
	4	10 + 5	15.00		7 36	56

It will be seen by the last column that the harmonic progression of the divisions obtained by this simple rule, agrees very closely with equable increments of the angle of elevation, falling somewhat short of two degrees for each division. Further the highest number, 12, gives nearly the latitude of *Calcutta,* or 22° 38′, the most northerly latitude for which the *Maldive* navigators have any occasion; while the lowest mark, 4, gives the latitude (nearly) of the southern point of *Ceylon,* or the average of the *Maldive* islands.

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* The man assured me it was for taking the longitude, and promised to come one night and use it in my presence, but failed.

It is a circumstance worth noting, that if the unit had been assumed at 6 diameters instead of 5, there would have been obtained a series of divisions almost identical with the *issabah* of 1° 36′ used by the navigators of the fifteenth century* according to the *Mohit.* The series may also be extended both ways without very much deviating from the same progression: thus, commencing with

				Lat.	Diff.
12 × 6	16	= 4.50	Cotang. of half angle.	25°04′	1° 32′
	15	4.80		23 32	31
	14	5.14		22 01	33
	13	5.54		20 28	32
	12	6.00		18 56	34
	11	6.54		17 24	34
	10	7.20		15 48	34
	9	8.00		14 14	34
	8	9.00		12 40	34
	7	10.29		11 06	34
	6	12.00		9 32	36
	5	14.40		7 56	34
	4	18.00		6 22	36
	3	24.00		4 46	36
	2	36.00		3 10	34
	1	72.00		1 36	36
	0	infinite		0	

In this manner a string, or a staff, may be marked off into tangential divisions, equivalent to the *issabah,* from *zero* or sixteen *issabah,* or up to an altitude of 25 degrees, within a limit of error by no means appreciable to the Arab *nakhoda,* and hardly of consequence to the refined navigator of modern times. Whether the practical rule thus developed was or was not resorted to, it is very plain that it might have been so adapted; and all the latitudes in Sidi's work might have been worked thereby; and the lower series of divisions might be nothing more than the same divisions numbered inversely on the lower side of the square staff, as will presently be noticed.

Fig. 2, the *bilisty*† is an evident improvement upon the original cord; a square rod of ebony being substituted for the stretching cord, and the radius being made to slide thereon at right angles. There is economy of space also,—the four sides of the wooden rod admitting of four series of divisions, adapted to four sliders of different sizes, so as to increase the scale without lengthening the rod inconveniently. Still the string has the advantage in point of portability. The rules for dividing the wooden bar are the same as for the string, but the marks must be laid off invertedly, beginning at the eye end, which is in this the fixed point.

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* See page 445. † بلستي

Fig. 3 is an instrument still used by the Arabs for taking the sun's altitude. It is exactly the same in principle as the above, but to obviate the inconvenience of looking at the sun, the eye is directed to the opposite point of the horizon, from the lower end of the cross bar, while it brings the solar shadow of the upper end of the same to meet the horizon by adjusting the slider *d* to or fro on the divided arm. The mode of dividing this arm, as performed in my presence by the *muallim*, or pilot, is represented in the plate; but it is obviously incorrect. A space *c e* is laid off equal to radius *a c;* from *e* a perpendicular *e f* is raised, and with the same radius a quadrant *e g* is drawn, which is divided into eighteen equal portions (of five degrees each); through these points are drawn radii to meet the tangential line; and the subdivision into simple degrees, and sixths, is either done by the eye, or by a continuation of the same rule. It will be seen on inspection of the figure, that as the angle *g f d* is equal to the sum of the angles *f d b* and *b d e*, while *b d e* is equal to *half* the angle of observation, angle *g f d* can only be equal to angle of observation when *f d b* and *b d c* are equal, and that the 90° point is therefore the only true one on the scale of divisions. The true mode of division is, as in the case of the string, to describe a quadrant from centre *b*, and to draw radii through each semi-degree of the arc from 45° downward, because the angle of observation *a d b* is, as before, equal to twice the angle *f b d*, of which *c d* (*c* 0, *c* 10, *c* 20, *c* 30, &c.) are respectively cotangents.

To ascertain whether the fault lay with my Arab informant, or with the instrument, I compared the actual divisions on the latter with a scale of cotangents, and found the following results, calling the radius *a c* = 1.00.

Angle of altitude.	Angle marked.	Length *c d* or cot. ½ angle.	True angle deduced.	Error of division.	Error if false mode had been used.
90°	0°	1.000	90° ′	0°	0° ′
85	5	1.096	84 46	—0 14	—0 30
80	10	1.196	79 48	—0 12	
75	15	1.308	74 46	—0 14	
70	20	1.435	69 44	—0 16	—3 30
65	25	1.557	65 26	+0 26	
60	30	1.719	60 22	+0 22	
55	35	1.911	55 14	+0 14	—7 27
50	40	2.142	50 04	+0 4	
45	45	2.418	45 0	0	
40	50	2.759	39 50	—0 10	—10 23

It is evident from this comparison, that the instrument was divided on correct principles, and that the *muallim* had ventured upon an explanation without duly qualifying himself by consulting his books. It is also clear that the same set of divisions may be made to serve for night observations by placing the eye at *d*: but as they only embrace altitudes exceeding 40 degrees, the instrument would not be applicable to the polar star in equatorial latitudes.

In conversing with the same *muallim* on the track taken in different monsoons, I remarked that he always talked of sailing upon different stars, in lieu of different points of the compass, as we should express ourselves. It immediately occurred to me, that this might explain some of the obscurities of the *Mohit*, where, for instance, that work directs the polar altitude to be found 7½ inches at the "setting of *Aquila*;" it might mean that the ship should steer upon the setting point of *Aquila*, until the pole should be depressed or raised to the altitude indicated.

I endeavoured therefore to procure an Arabic compass, but not one could be met with in all the vessels—at length my friend Syed Hossin Sidi found a drawing of it in one of the practical works on navigation, (the *májid kitáb**) in possession of a *nakhoda*, and without ceremony tore out the leaf to shew it to me, as the captain was afraid of parting with the volume, without which doubtless he would have been greatly at a loss on his return voyage. I immediately made a lithograph drawing of it (fig. 5) exactly as I found it, with the circle of English numbers, shewing it to have been copied from a European card, around which the names by which the Arabs "box the compass," had been entered as more conformable to their own practice.

These names would seem to point to a time anterior to the invention of the magnetic compass, when indeed the only way of ascertaining the relative position of a ship at night in the broad ocean was by observing the points of the horizon where prominent stars rose and set. The system could only have been adapted to intertropical navigation, wherein no very great variation occurs in these azimuths, and it is necessarily but an approximation to truth, as hardly any of the prominent stars selected rise or set at the precise azimuth named from them. By the positions assigned to some of the southern stars, we must suppose that it was framed rather to suit places northward of the equator; but in drawing out the following comparative view, I have thought it preferable to enter the azimuth of each star on an equatorial projection, when of course the azimuth is equal to the polar distance, and the compass card thus affords to the Arab *nakhoda* a rude table of N. P. D. by which he may, if he please, take his latitude, with the simple instruments above described.

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* ماجدكتاب or, as my Maldive friend facetiously expressed it, the "*John Hamilton kitáb*" of the Arabs. It would be a work of great utility to print an edition of this volume, with emendations and additions suited to the people, who depend upon it as we do on our Greenwich Ephemeris!

The card may be divided into two great portions, the eastern and western, in which the same names of stars occur in a direct and inverse order—on the east with the prefix مطلع *mutalá*, or " rising place of ;" on the west with that of مغيب *maghíb*, " setting place of :" the north-eastern quarter has written on its circumference,

من الجاه طرف المطلع مطلعي شمالي العرض زايد والطول زايد

"From the *north* towards the *east*, *Mutaláí Shimálí*,—(the *north-eastern* quarter,)—latitude increasing, longitude increasing."

The south-eastern in like manner has the words :

من المطلع طرف القطب العرض قاصر والطول زايد مطلعي جنوبي

"From the *east* towards the *south*, *Mutaláí Janúbi*, (or the *south-eastern* quarter,) the latitude diminishes, longitude increases."

The north-western :

من المغيب طرف الجاه مغيبي شمالي العرض زايد والطول قاصر

"From the *west* to the *north*, the *north-western* quarter, *Maghíbí Shimálí*, latitude increasing, longitude decreasing."

The south-western :

من القطب طرف المغيب لمغيبي جنوبي الطول قاصر و العرض قاصر
على هز الجناب اذا كنت شمالي الخط *

"From the *south* towards the *west*, *Maghíbí Janúbi*, the *south-western* quarter ; longitude decreases and latitude decreases ;—when you are to the north of the line."

The final words, *when you are to the north of the line*, apply equally to the remarks on all four quadrants ; for example, when you sail on any point of the compass between north and west, you increase your latitude and longitude—and so forth.

The north point, or pole, is called, as in Sidí Alí's work جاه *júh*, a word not to be found with this acceptation in our dictionaries ; nor is قطب *qutb*, generally confined to the south pole, but rather the contrary. مطلع *matlá*, the rising place, and مغيب *maghíb*, the setting place (to wit, of the sun) are the terms used for the east and west cardinal points. It will be sufficient to enumerate one series of the intermediate *stars* in the order of their occurrence on the card.

1. N. by W. 11° 15°. مغيب فرقد, the setting point of *farqad*, the calf ; one of the two stars known by the name of *farqadain*, (β et γ ursæ minoris.) η approaches nearest to the required north polar distance.

2. N. N. W. 22° 30′. مغيب نعش, the setting of *násh*, the bier. This constellation comprises the four stars of the belly, both of the small and the great bear, but generally and in the present instance, the name applies to the latter, of which, however, the position is nearer 30 degrees than 22½ in azimuth.

3. N. by N. 30° 45′. مغيب ناقه, the setting of *náqeh*, the she-camel, probably the same as العناق, the goat, of Dr. Dorn's celestial globe, the middle star of the tail of the great bear, *N. P. D.* 34°.

4. N. W. 45° 0. مغيب عيوق, the setting of *dyúq*, the kitten, αιουκ of the Greeks, or capella; whose north polar distance is in fact 44¼ degrees.

5. N. W. by W. 56° 15′. مغيب واقع, the setting of *wáqá*, the vulture, *wega* of our astronomy or α lyræ, *N. P. D.* 51½ degrees. This is the star translated by the Baron Hammer as *Aquila;* but the azimuth shews it to be Lyra.

6. W. N. W. 67° 30′. مطلع سماك, the setting of *simak*, contracted for سماك الرامح *simák ul rámá*, the spear-bearer, Arcturus, *N. P. D.* 70°. It is *Ascimech aremeah* of the Alphonsine tables.

7. W. by N. 78° 45′. مطلع الثريا, the setting of *surayá*, the Pleiades. The north polar distance of these stars differs so much from the azimuth here assigned, (being only 67°,) that the name is possibly applied to Aldebaran, (*N. P. D.* 73° 50′) although the latter is the true Arabic denomination of α Tauri.

8. W. 90°. مغيب, the setting place (of the sun), nearly constant in the equatorial regions.

9. W. by S. 101° 15′. مغيب الجوزا, the setting of *jozá*, a contraction for رجل الجوزا the giant's foot, known to Europeans as Rigel in the right foot of Orion, *N. P. D.* 98.24.

10. W. S. W. 112° 30′. مغيب التير, the setting of *tír*. I do not find any star of this name on the celestial globe described by Dr. Dorn in the Roy. As. Soc. Trans., nor is the word Arabic. The similarity of sound and near coincidence of azimuth might incline me to consider it as Antares, (115° 40′,) were it possible that the word نير *nír*, bright, in the passage quoted by Dorn from Ebn Muhammed, could be changed to تير the name of the star before us: the passage is as follows:

وصورة العقرب معلوم الاكثر معروف ويكون عند مغرز ذنب كوكب
نير احمر من القدر الثاني هو قلب العقرب من منازل القمر *

* The constellation of the scorpion is known, to every one: on the buttock there is a bright reddish star of the second magnitude,

which is the scorpion's heart." If the Arabic name of this star be *qalb ul ăqrab*, whence was our name of Antares derived?

The only other resembling *tír* in sound is الطاير marked as *Atair* on our globes, and comprehending the three bright stars of *Aquila;* but the position of this constellation puts it out of the question.

11. S. W. by W. 123° 45′. مغيب اكليل, the setting of *Akleil,* the crown. There are several constellations so named. *Corona borealis* is called الفكة, and is much too far north. There is another *akleil* (*janúbí*) the southern crown, situated about azim. 130° which is nearer the mark: but the constellation intended may possibly be الاكليل العقرب, the crown of the scorpion, the 17th lunar mansion of Ulugh Beg; notwithstanding its error of azimuth. In position, the bright star Fomalhaut (فم الحوت) of Pisces Australis comes much nearer the mark, (121°) and it seems curious that it should have been set aside for a less conspicuous group.

12. S. W. 135°. مغيب عقرب, the setting of *ăqrab,* the Scorpion. We shall see presently that *antares* is the star of this constellation here intended, although it is far too northerly for the position. But for such confirmation we might have suspected *ăqrab* to be a corruption of الغراب *alghoráb:* the crow (κοραξ) which lies in 134° azimuth.

13. S. W. by S. 146° 15′. مغيب حمارين, the setting of *Hamárein* the two asses. This name is not to be found in the globe. The nearest to it in situation are α and β Gruis.

14. S. S. W. 157° 30′. مغيب سهيل, the setting of *Soheil,* the well-known star Canopus in the constellation Argo, *Alsafinah* of the Arabs. The north polar distance of this star, however, is only 143½ in lieu of 157½. It would set in azimuth 157½ at a place situated in north latitude 28°; so that if this be taken as a clue, we may trace the origin of the compass scheme to *Lower Egypt* or *Syria.*

15. S. by W. 168° 45. مغيب سلبار, the setting of *salibár.* As we proceed southwards it becomes more and more difficult to find the stars intended. Canopus indeed is almost the only one familiar to us. *Salibár* is not to be found on the globe, nor in the dictionaries: but it is the very word translated *Lyra* by the Baron Hammer, a northern constellation, which would be quite inadmissible in the southernmost situation of the compass. There is a constellation somewhat similar in sound on the brass globe described by Dr. Dorn, called السبع *Alsabă,* the beast, lying close to the Centaur with which its stars are mixed.—Again, should α Centauri be the star intended, it would be about the right distance in azimuth from Canopus—but this star is called

with its fellow in the other leg of the Centaur, حضار والوزن *Hazár-o-ulwazn* on the globe. The only other star of note falling within moderate limit of distance is α Eridani, or *Achernar* of our globe, which is a corruption of اخر النهر *akhir-ulnehr*, 'the end of the river.'—Whatever star may be meant by *salibár*, it is surely more southerly than Canopus, and by no means Lyra. The two or three translated passages from the *Mohit* equally confirm this, and receive illustration from it. In the voyage to *Gujerát* (page 456) the translation says—"In this measure (the *kiás*, or lat. 16° 54′ north) Lyra *(salibár)* is five inches (13° 30′), or Sagitta (*sahm awal*) six inches (15° 6′), or Canopus and Lyra are equal to three inches and a half (11° 6′)." The second paragraph in page 457 is expressed almost in the same words. Now if for السهم *ul sahm* be read النهر *ul nahr* (α Eridani), and for *salibár* we take η Argonavis, the above conditions may very nearly be complied with; for, in north latitude 17°, Canopus and η Argo will be seen at an altitude of 12° together, on opposite sides of the south pole at the hour of 10 p. m. in the beginning of March. The north polar distance of α Centauri (150°) would better suit the given meridional elevation (13° 30′) than that of Argonavis: but in this case it must be *alnahr* and not *salibár* which must be coupled with Canopus at the equal altitude 11° 6′: and the text would need a second alteration.

Again, in page 456 (the latitude by position being about 18°) the translation says—"If it be not time for taking the polar star, take the height at the setting of Aquila (*nasr-wáqá*) by the Lyra (*salibár*) which gives 7½ inches (or 17° 30′)." Now first correcting *vega*, which we know to be α Lyræ, and not *Aquila*, we shall find that at his setting, the star above pointed out as *akhir-ulnehr*, Achernar, comes to the southern meridian, and bears very nearly the altitude required.

Here then *salibár* would seem to be α Eridani, whereas in the other two cases it may be η Argo. Until we get somebody to point out the actual star in the heavens, it will be impossible to decide between the two; but a considerable step towards the solution of the *Mohit* problem has, at any rate, been made by the discovery that *salibár* belongs to the southern hemisphere.

If the Baron will favor us with a translation of the first chapter which treats of the names of the stars, the division of the circle of the skies, and, above all, of the cardinal points of the compass, we shall doubtless be able to clear up all these points in a satisfactory manner.

The navigators of the Maldive islands follow the Arabs in their division of the compass which they call *samaqá* اسمقا a name apparently taken from the *Malabar* word, *samoukká*, for which M. Klaproth is at a loss to discover the origin*, though it seems obviously a corruption of the Sanscrit term चुम्बक *chumbaka*, the loadstone. The Maldivís alter a few of the names, particularly towards the south, Some of these variations serve to throw light upon the doubtful parts of the Arabic list. The orthography also, as written in my presence by my intelligent friend Muhammad, better known among his island countrymen as *Ustád-muallim*, the master-pilot, differs considerably, being more of the Malay style: one letter an ع with a dot under it, is, he tells me, peculiar to his islands; it has the pronunciation of *gh*, not of غ, while ق is pronounced more like *g*. The following is his catalogue:

عو, pronounced *ghao*, the north pole—of unknown derivation.

فرعديم *farghadèm*, a corruption of *farkadain*.

ناس *násh*, the *alif* substituted for *ain*.

ايوق *áyouk*, ditto.

قاسل *gásil*, used for α Lyræ in lieu of *wáqá* or Wega.

سماق *simág*, the ق used for ک.

تريان *therián*, a corruption from *suraya*.

مرع *murgh*, the west—derivation unknown, perhaps corrupted from *maghib*,—*irua* is the east.

جوزا *jozá*, the star Rigel.

تير *tír*. Can this be Sirius, which is the next conspicuous star more southerly than *Rigel?* Its Arabic name is الشعري.

اقرب *agrab*, in lieu of *akleil*, shewing that the crown intended is the *akleil ul ágrab* of the globe, which consists, according to Ulugh Beg, of β, δ, η and γ of Scorpio; β has a N. P. D. of 112° only, which would give an azimuth of 115° in latitude 28° north.

قلب *galb*. If this be correct in orthography, it would denote قلب العقرب *qalb ul ágrab*, the scorpion's heart, or Antares: but if intended for كلب the dog, it may stand for Sirius. The former is, however, most probable, because it confirms the Arabic name for the same point which is عقرب, or simply the scorpion, of which the principal star is Antares.

حمارم *hamárím*, the final *m* substituted for *n*.

سل *sil*, pronounced *silli*, an unknown substitute for *sohéil*, which will be seen to be removed further south; perhaps it is the local name of Canopus, corrupted from the Arabic.

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* Klaproth sur l'invention de la boussole, p. 32.

سلوار *siliwár*, the *w* substituted for *b*.

سهيل *soheil*, Canopus, is used by the Maldive sailors as the south cardinal point,—for what reason I was unable to discover. They also use the Indian word *dakhan*.

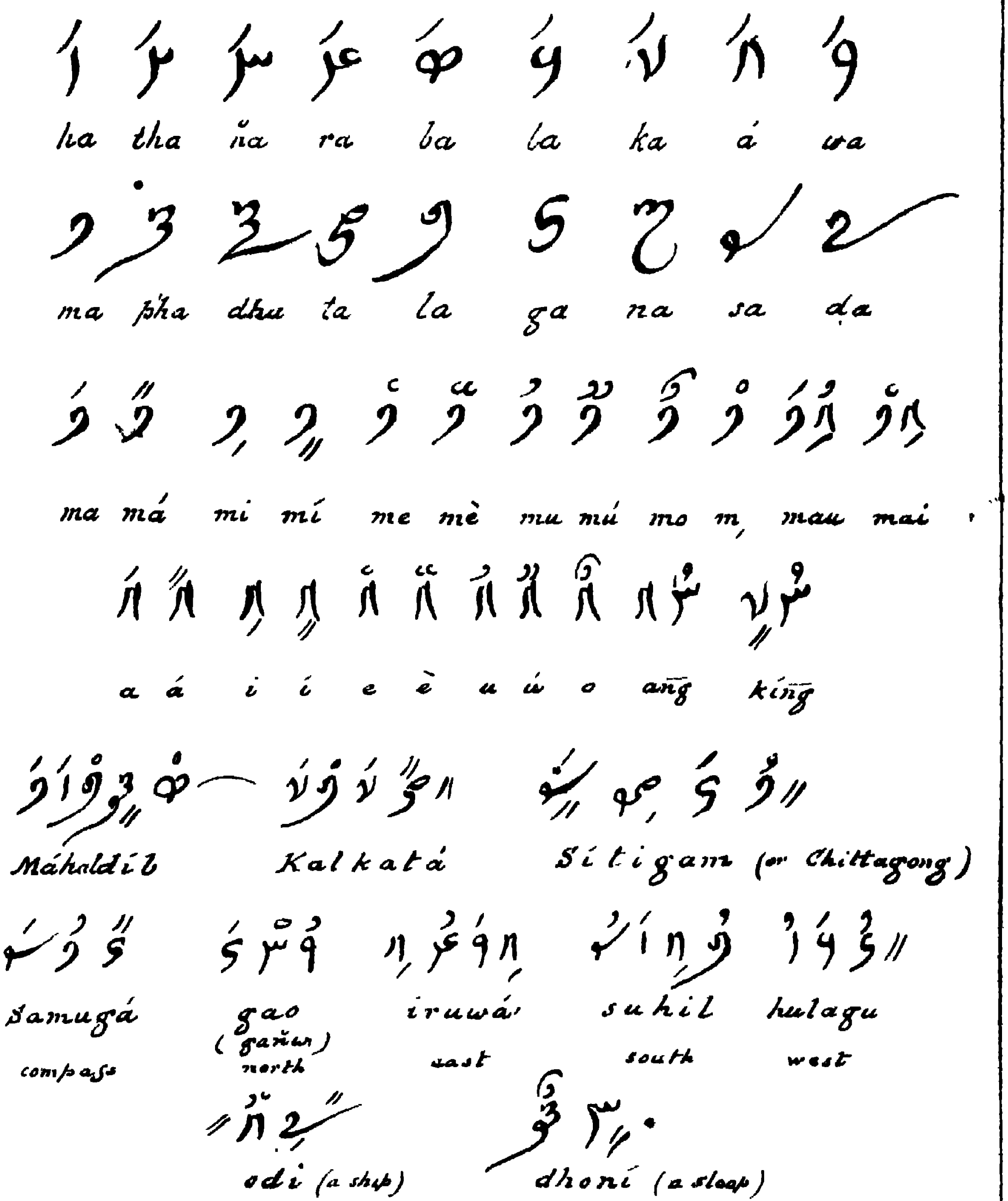
Note on the Maldive Alphabet.

While conversing with the *Ustád-muallim* one day on the above subject, I got him to write down the names as seen above in the Arabic character: being curious, however, about the modification of the ع *ain* introduced, I inquired whether the Maldive population had any distinct alphabet of their own, to which he replied in the affirmative, and gave it me in writing just as I have lithographed it in Plate XLIX—a most whimsical system, and calculated to puzzle antiquarians egregiously should they chance to stumble upon an inscription in the Maldives without possessing the key to it!

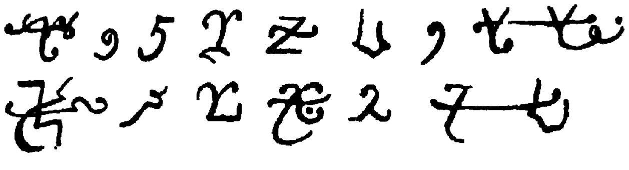
At first he told me they had but nine letters, (the second row in the plate,) *m, ph, d, t, l, g, n, s, d*; but on my observing that he made use of a letter not in this list for the *k* of *Calcutta*, he said—"Oh yes, there are the other nine" (the upper row)—meaning, as I presumed, that they were not indigenous but extraneous signs introduced to express foreign sounds: they are, in fact, the nine Arabic numerals with a dash above them to distinguish them from the ciphers. He wrote with greater fluency in these his native characters than in the Arabic.

The system of vowel marks is partly an imitation of the Arabic and partly of the Indian method; the long vowels being denoted by doubling the diacritical stroke: the nasal *n* is marked like the Sanscrit *anuswara*, but the letter م is also inserted. It was striking to observe how readily his ear distinguished the sound of a diphthong, and how correctly he expressed it with a double character. The order of writing is from left to right, contrary to the Arabic mode, and none of the letters admit of being joined together or abbreviated; but I pretend to no more knowledge of the alphabet, or language, than is comprehended in the plate itself, and need not, therefore, attempt to expand the materials of a short interview between two parties but imperfectly understanding one another, into a treatise on the unknown and, perchance, non-existent literature of these simple islanders.—It will, doubtless, surprise many that they should have arrived at all at the possession of an alphabet of their own. Among the specimens in the plate I have introduced the names of the cardinal points as given above.

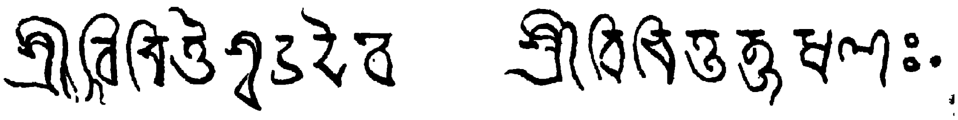
Maldive Alphabet.



Inscription on a Cannon at Lisbon, (sent thither from Goa), in Sanscrit letters.



Inscription on an ancient unfinished temple on a rock near Atgarh*, in Cuttack.
by Lt. Kittoe



J. Prinsep lith.

[illegible] Oriental Lithᵒ Press

VII.—*Facsimiles of Ancient Inscriptions, lithographed.*

(Continued from page 731.)

Inscription on a Cannon from Goa.

At the foot of Plate XLIX. I have inserted the copy of an inscription which, it seems has long puzzled the savans of *Lisbon*. Mr. J. Gaudart, chief interpreter and sworn translator to the British Government at Penang, Singapur, and Malacca, has addressed the Rev. Anselmo Yegros, Vicar General of the Singapur Mission, on the subject, affording, as he conceives, a full explanation of its purport; but either the characters must be exceedingly perverted in the copy, or Mr. Gaudart must have a powerful imagination, to convert, as he does, such hieroglyphics into the following Sanscrit sentence:

श्रीव भाग्य उत्तम राज राम
स्वकीय १२ मेष ७२८

which he translates, "(cette) heureux (et) puissant manufacture appartient au bon Roi Rám le 12 de Bélier 728."

The rája here designated as the proprietor of the gun (if the reading be conceded) the translator explains to be *Ráma varma vira Martanda Perumal Tamuri*, who reigned at *Calicut* from the year 718, (A. D. 1542,) to 736 (A. D. 1561,) of the Parasuráma cycle. He was engaged in severe struggles with the Portuguese, and it is probable that the piece of ordnance thus fell into the hands of his enemies.

Of the letters themselves those only that bear resemblance to old Sanscrit, are the 1st, 3rd, and 4th. The rest appear purely conjectural.

Inscription at Kandharpur.

Lieutenant Kittoe, already well known to my readers for his antiquarian and architectural zeal, has, on his recent march with his regiment towards *Gumsur*, taken every opportunity of examining objects of antiquity in his route. The only inscription he has yet met with is shewn at the foot of Pl. XLIX. "It is (he writes from *Cuttack*) contained in two compartments of a very ancient and unfinished temple on a rock in an island near *A'tgarh;* at a place called *Kandharpur* or *Kandalpur.*" The characters are of the old Bengálí or Gáur type: and may be thus transcribed in modern Deva Nágarí; श्रीविचित्रश्वरदेवः श्रीविचित्र भूषण: "the divine lord of beauteous variety, the variegated ornament"—being the epithet, doubtless, given to the form of Siva, established or intended to be *sthápan'd* in the temple.

VIII.—*Description of* UCH-SHARI'F. *By Munshí* MOHAN LÁL.

[Dated Sít Pun, on the joint streams of the Panjáb.]

Uch, surnamed *Uch-Sharíf*, or holy *Uch*, which being near the junction of the united streams Hesudrus, Hyphasis, and Hydraotes, Acesines, and Hydaspes, attracts the notice of geographers, contains numerous sepulchres of the Muhammadan saints. The oldest of all is that of SHÁH SÁIF UL HÁQQÁRÍ, but it dwindles into obscurity. A miserable wall without the roof environs the dust of the above saint.

If I write the respective names of the saints of *Uch*, along with their incredible miracles, I fear to enlarge my remarks: however, I presume to lay before you the endeavors of my feeble pen in regard to SHÁH SÍAD JALÁL and his reputed descendants. He died 600 years ago, and is said to have lived to the age of 150. His tomb, which is inside a large but gloomy room, is elevated about five spans from the surface of the ground. It is a very simple building, adorned with the poor frail and old canopy. Both of his sides have ten graves of his offspring. They are distinguished by one rising above the other, which fill the entire position of the room. None of them have any kind of inscription.

SHÁH SÍAD JALÁL acquired a very great fame by defeating the HALÁSSU', and converting his son BOLÁQU' into Islámism. He was the ruler of *Betúwahí*, near *Baháwalpur*.

JALÁL had three sons, AHMAD KABÍR, BAHÁ UDDÍN, and SÍAD MUHAMMAD. When the first of the three was about ten years old, he happened to meet a man in the bazár, whose son had died of some disease. He applied to AHMAD KABÍR to restore his dead son to life. The young saint, after making ablution, turned his face towards *Mecca*, and repeated the words " Qum bi izn Alláh*," which literally means, Get up by the command of God.

Such is the wonderful miracle described of AHMAD KABÍR. When he grew older, he became the father of the two reputed sons, SÍAD JALÁL UDDÍN and SÍAD MUHAMMAD RÁJU'. The former was called by the name of MAKHDU'M JAHANÍÁN JAHÁN GASHT, (or the traveller and the Lord of all beings;) and the latter, RÁJU' QATTÁL, (or the Rájú slayer.) Numerous miracles were wrought by these two brothers. They went to pilgrimage through *Persia*, &c. &c. &c., marrying a great number of wives, and leaving children in every country, which, tradition says, amounted to 12,000; but I doubt the authenticity of the information.

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* The power of raising the dead by saying the above mentioned word, I hitherto knew was only peculiar to Jesus Christ.

When the Makhdu'm reached *Madíná* he was suspected to be a common Musalmán and not a Síad. On this he stood out of the door, and, looking at the tomb of Muhammad, cried as follows: " *Assalám alaikíkí yá jaddi*" (or, Peace be with you, O grandfather); when came the answer " *Va alaiki ussalám yá valdí,*" (or, Peace be with you, O son) out of Muhammad's tomb, which convinced the men of the shrine that he was a real Síad. People assert that this proves his being the respected and first saint of the Musalmáns. On receiving the intelligence, I desired to visit the monument of such a renowned holy man of *Uch.*

In company with my countryman and school-fellow, Pandit Káshínáth, we proceeded to the town of *Uch,* and passed through a few narrow streets on our way to the shrine.

On coming to the door, which has dwindled into the most ruinous state, we descended towards the west, and turning to the south entered the room where the body of the Makhdu'm rests. The tomb is a very poor structure, but raised about seven feet high from the ground, which is concealed by numerous other graves. There is nothing admirable in the shrine of the Makhdu'm. Three small openings give light inside the apartment.

The following Persian inscription written on the door, presents us with the date of the Makhdu'm's death.

تاریک گشت جمله جهان بی جمال شاه   تاریخ بود هفتصد و هشتاد و پنج سال

" Tárìk gasht jumlah jahán be jamál Sháh,
Tárikh búd haft sad o hashtád o panj sál."

When the world was covered by darkness without the countenance of the Sháh, (or Makhdúm.) The date was 785 of the Hijrí era.

The mausoleum of Makhdu'm Jahánián Jahán Gasht is annually visited by the pilgrims of the distant country. It is a popular belief in this region, that a fool can get restored to perfect sense by eating the earth of this tomb.

It is very odd that the tombs of the saints of the holy *Uch,* who possessed such boundless reputation and respect in days of old, have been not adorned with any kind of architectural beauty, either by their posterity or believers, except that of " Bíbí Jind Vadí," (or the lady of the long life.) It is situate on the verge of a precipice which commands the old bed of the *Panjáb* rivers, and gives a romantic view.

The southern part of this magnificent sepulchre has been unfortunately swept away by the late inundation of the above streams.

Besides this, it suffers a good deal by the neglect of the Musalmáns, who do not repair it. The door, which has been entirely eaten by worms, opens towards the east, and has a sight of the other two cupolas. They excel in material and handsomeness the others of *Uch,* except that of " Bíbí Jind Vadí."

" Bíbí Jind Vadí" was one of the descendants of Sháh Síad Jalál, of whom I have already spoken. The dome in which she sleeps is erected of burnt bricks, which are cemented by mortar. The whole of the edifice is ornamented by various hues and lapis lazuli of the celebrated mines of *Badakhshán.* The size of this grand building may be estimated at about 50 feet high, and the circumference 25.

Though the clouds had unluckily obscured the light of the day, still we endeavoured to take a sketch of the Bíbí Jínd Vadí's mausoleum by means of the camera obscura. I herewith enclose a copy of it—[which we omit for reasons given on a formar occasion.—Ed.]

IX.—*Specimens of the Soil and Salt from the Sámar, or Sambhur lake salt-works. Collected by Lieut.* Arthur Conolly, *and analyzed by Mr.* J. Stephenson.

It is now more than a year since I received from my friend Lieut. A. Conolly the specimens named at the head of this article. They were on a very large scale, and packed up so carefully as to exhibit on arrival, almost as perfect a picture of the process and progress of the salt manufacture at the celebrated lakes of *Sámar,* as could be obtained by a personal visit to the spot.

At my request, Mr. Stephenson submitted such of the specimens as seemed to require it, to chemical examination in my laboratory, and where the results were unexpected, I verified them myself by re-examination. My sole reason for delaying the publication of these very interesting memoranda was, that I was in hopes Lieut. Conolly would favor me with a full account of the manufacture, which, however, public business and subsequently ill health obliged him to postpone—and thus time has crept on until the specimens themselves have nearly dissolved away in the damp air of the last rains; and unless I place on record what I already possess, there will hereafter be no means of consulting the perishable materials to prepare another report.

The labels which accompanied the parcel were so full and explicit, that, when followed by the chemical notes referring to the numbered specimens, they formed nearly as comprehensive a view of the operation as could be wished: I will therefore first place these before the reader.

Note on Sámar lake salt and earth, by Lieut. A. Conolly.

While acting as Salt Collector for two months at *Sambhur*, I employed part of my time in putting together officially some interesting notes, historical (semi-fabulous rather), and statistical, concerning this marvellous spot, collected by my friend N. B. Edmonstone, Esq. Superintendent of *Ajmír*, when he went to take possession for the Honorable Company at the beginning of the year (1835). Connected therewith it would be desirable to have scientific examination of the produce of the mines, for which purpose I send them to you under charge of a servant; and will here detail the contents of the boxes.

A 1.—A long box containing a quantity of the mud which forms the bed of *Sambhur* lake, and which yields as often as it is covered by (a few inches depth of) water, and acted upon by a hot atmosphere. This mud was dug out before me from the bed of a "*kiyár*" (or vat) just after it had yielded a good crust of salt crystals, when it was of the consistency of a stiff jelly. The mud nearest to the surface was put next to the part of the box at which the lid is laid hold of, (in order that it may be drawn out,) and so on downwards till the box was filled.

A 2.—A box divided into three parts, containing as many sorts of earth. 1st. Some of the black mud just mentioned, which has the depth of about half a *gaz* below the surface of the lake. 2nd. A bluish earth which soon hardens into a friable cake and seems a compound of what lies above and below it. This has a depth of half a *gaz* under the black mud. 3rd. A white sandy earth, which has a depth of from five to six *gaz* under the second strata. This I learned from the *Sambhur* Sherishtahdar who sent the specimens after me to *Jaipúr* on the 10th July. He wrote "under strata No. 3 lies white stone from which chunam is made." I immediately sent off an express to say that I would make the fortune of any enterprising digger who would dive for some of this stone, but the Serishtahdar returned for answer that the attempt had been made in vain, (rain) water having covered the whole surface of the marsh. He dug on the very edge of the lake, where there was no black mud, but only the earth No. 2, and he found nothing but this (he wrote) to the depth of *6 gaz*, when the influx of water obliged the diggers to give over work. He wrote moreover, some of the "oldest inhabitants say that all parts of the lake are not alike; that in some places you dig and find the three sorts of earth sent; in others, below the mud only '*sang i kuchet*' (?) In others again only mud that has no bottom."

I may further mention that the Serishtahdar wrote—"The people call the *gil i safeid*, *Pindole* (H.) and make whitewash from it." This inducing a belief that it contained lime, I poured vinegar on a bit which immediately effervesced. I fancy this sort of earth is used to make the very delicate porous vessels out of which the better sort of natives drink in summer.

A 3.—Three pieces from the surface of a *kiyár* (vat) off which a crop (crust) of salt had just been raked.

4. A piece of ditto, on which, apparently, the salt did not come out well.

5. A piece of ditto, near the edge on which the salt did not form.

6. A piece of ditto, the salt of which got mixed with scum while forming.

7. A piece which seems to have been similarly mixed, but which was cut from another *kiyár*, and said to be five or six years old. It has evidently been rained upon, and it was taken from under a sheet of rain water, by which more of it would have been melted had it not been old and *pakká*.

8 a.—A piece on the scum of which crystals were formed after rain had fallen upon it.

8 b.—A ditto ditto.

8 c.—A ditto ditto.

9. A piece the salt of which got somewhat mixed with mud when being formed, (probably from its being agitated by a strong wind) and on which a crust of scum settled.

10. A piece of crust, chiefly scum, such as is thrown aside as useless.

11. Other refuse pieces taken from a kiyár in which they had been lying neglected for, perhaps, some years.

12. Pieces of crust of *salt* from the surface of a kiyár.

13. Ditto ditto. N. B. These have been more or less smoothed and thinned by having been rained upon.

14. Bits of a fine crust of salt with a little scum on the top. This was cut with a phaurá from the surface of a kiyár.

14 a. Three other bits of a different kiyár.

14 b. Another of another.

The above five items are merely varieties to enable you to trace the process of formation.

A 15.—"*Bachek*," or infant crystals, about the smallest size in which the mineral particles come to view on the surface of the salt mud, after the partial evaporation of a body of water covering it. These were taken from under a sheet of water six fingers (or three inches) deep.

16. Crystals about two days old (after first formation) six fingers' depth of water at first, 1½ fingers' depth evaporated when crystals taken out.

17. Ditto about three days old; or when two of six fingers' depth of water had evaporated.

18. Ditto about four days after first formation, or when three of six fingers' water had evaporated.

19. Ditto of a fair (common) size, produced after about eight days' evaporation of six fingers deep water.—N. B. These crystals were found during the hot winds, when the day's heat was intense, and that of the night considerable.

20. Crystals which formed on a stick after it had lain seven days in the six finger water from which the last mentioned (19) were taken after eight days.

21. Ditto. The concretion is more rapid on a thread, or stick, or any thing that the water can get round, than on the surface of the mud.

22. Crystals made in a kiyár in 20 days during the hottest season. 12 fingers' depth of water at first, four remaining when crystals were taken out.

23. Crystals taken from the lake after a complete and uninterrupted evaporation of a body of water five or six, or perhaps more, inches deep.

24. Pink crystals from the surface of the marsh; formed by the rapid evaporation of a shallow deposit (or *puddle*) of water.

A 25.—Good *Sambhur* salt, such as a *byopári* would call *pakká*, and readily buy.

26. Superior ditto, such as a *byopári* would *covet*—a year or so old.

B 1.—" The grandfather of all salt" (the literal expression of the man who brought it.) A lump taken out of an old pit eight cubits deep, said to have been re-opened after a lapse of 100 years. In this may be observed several layers, but for which I should have been ready to believe that the diggers had arrived at the top of an under ground chain of salt mountains, such as those beyond the Indus, which Elphinstone describes, and that they had just chipped off a peak. You must know that the bed of the *Sambhur* lake is, for the most part, as shallow as a dish, and that after the rains it gradually becomes dry; *when* dry the natives dig pits a few cubits' depth in the bed of the marsh, and pour the salt water that they thus obtain into vats (made with large stakes, grass, and earth), in which it evaporates in from eight to fifteen days, according to the depth of its sheet, and the state of the weather. A pit is dug for a few rupees, so an old one is not usually restored after the rains: the water deposited in it dries into a cake of salt at its bottom; then a little sand is blown in, and then another rainy season comes, and a second layer is formed, and so on for perhaps many seasons, when, the pit becoming filled, all traces of its contents disappear till the sinker of a fresh well hits upon them.

2. Another lump taken out of another pit three or four cubits deep.

B 3.—Another from another.

4. Another bit from another pit.—N. B. All four specimens were extracted when water was above them.

5, 6, 7. Lump crystals and intermediate strata of earth from other pits.

8 and 9. Loose crystals from a pit four cubits deep.—Ditto from ditto, eight cubits deep.—N. B. You will observe that nearly all the *Sambhur* salt crystals grow into the shape of a four-sided pyramid. I see in the Cyclopedia that the cube is given as the ascertained primitive form of 11 minerals, of which salt is one; please to *dissect* a crystal till you arrive at its nucleus, and if you have leisure, tell me the process of structure, for " *Sakamberí jí,*" the tutelary goddess of the Chouhan Rajpúts, for one of whom she in the year 608 S. miraculously made the lake, appears to reverse the order of architecture in putting together her mineral particles, causing them to rise from a point to a base*.

10. A piece from a pit, the crystals of which are slightly coloured.

Examination of selected Specimens from the above. By J. Stephenson.

A No. 1.—*Mud from the bed of Sambhur Lake.*

An average portion digested in distilled water, and the filtered solution (which appeared of a reddish brown colour), subjected to the usual tests, gave the following results.

Nitrate of barytes,	Copious white precipitate.
Nitrate of silver,	Ditto flambent grey ditto.
Prussiate of potash,	No change.
Oxalate of ammonia,	Ditto ditto.
Litmus paper,	Ditto ditto.
Turmeric ditto,	Ditto ditto.

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* The pyramidal appearance is merely from truncation of the cube. The solid angle of the cube seems to resist solution more than the rest of the crystal.—Ed.

300 grains exposed to a gentle heat in order to drive off the moisture lost 107 = 35, 6 per cent.

100 grains of the dry mud was now put into solution, and the insoluble matter collected on the filter, washed, dried, and weighed, gave 70 grains.

The filtered solution treated with nitrate of barytes threw down a precipitate of sulphate of barytes, together with the colouring matter, which after washing, drying, and weighing, gave 17 grains = 10.4 sulphate of soda.

The solution now freed from the sulphate was next treated with nitrate of silver, from which a precipitate of muriate of silver was obtained, weighing 42 grains = 19.5 muriate of soda.

Insoluble matter,	70	0
Sulphate of soda,	10	4
Muriate of soda,	19	5
Loss,	0	1
	100	0

Examination of the insoluble matter from A No. 1, after the separation, as above, of the sulphates and muriates.

Fifty grains of the insoluble earthy matter now freed from the extraneous salts was treated with muriatic acid. A strong effervescence took place, and the digestion was continued for 12 hours, as there was reason to suppose that carbonate of lime was present. It was now repeatedly washed with pure water, and the remaining earthy matter, which the acid had not dissolved, separated and collected on the filter, well dried and weighed : it amounted to 37 grains.

The muriatic solution was now treated with oxalate of ammonia, which threw down a copious precipitate of oxalate of lime. This being well washed, and dried, weighed 11 grains = 8.6 carbonate of lime.

The remaining solution contained a considerable portion of loose muriatic acid, which being neutralized with pure liquid ammonia, a portion of alumina (tinged with yellow oxide of iron) was precipitated. This being separated by the filter, washed, dried, and weighed, gave 4 grains.

Calculating then for per centage, the composition of this earthy matter will stand as follows :

Matter insoluble in muriatic acid (silica,)	74	0
Carbonate of lime,	17	2
Alumina and oxide of iron,	8	0
Loss,	0	8
	100	0

A No. 10.—This I found to be chiefly composed of sulphate of soda, with the carbonate and muriate of soda in considerable proportion.

A No. 15.—This gave a trace of sulphate ; otherwise good salt ; though the crystals are small.

A No. 22.—When tasted gave traces of sulphate.

A No. 24.—Crystals of a pink colour, which disappear in the filtered solution ; the colouring matter appears to be volatile—sulphate of soda predominates in this sample ; no carbonate of soda present.

B No. 1, *from an old deep pit re-opened after* 100 *years. Examination by tests.*

Nitrate of silver,	Copious precipitate.
Nitrate of barytes,	Very copious ditto.
Oxalate of ammonia,	No change.
Prussiate of potash,	Ditto ditto.
Litmus paper,	Ditto ditto.
Turmeric ditto,	Ditto ditto.

A fair average sample was taken through the whole thickness of the lump.

100 grains exposed to a gentle heat lost 5.5 grains moisture.

100 grains treated with nitrate of barytes gave a precipitate, which after having been well washed and dried, weighed 136 = 83 sulphate of soda.

The filtered solution treated with nitrate of silver produced a precipitate of chloride of silver, which after having been well washed and dried, weighed 22 grains = 10.4 muriate of soda.

The composition of this sample is then as follows:

Insoluble matter,	1	0
Moisture,	5	5
Sulphate of soda, (and carbonate ?)	83	0
Muriate of soda,	10	4
Loss,	0	1
	100	0

A No. 6.—The salt of which got mixed with scum while forming, appeared very wet.

When tested, this sample appeared to contain a considerable portion of alkali, especially the reddish coloured part called *scum* in the list.

100 grains dissolved, and the insoluble matter separated by the filter, washed and dried, gave 2 grains.

To the filtered solution was added acetic acid till the alkali became neutralized; after which it was treated with nitrate of barytes; the sulphate of barytes was precipitated, and having been well washed and dried, weighed 84 grains = 51 sulphate of soda.

Nitrate of silver threw down a precipitate of chloride of silver that weighed (after washing and drying) 30 grains = 14 muriate of soda.

In order to ascertain the quantity of alkali in this sample, 100 grains were dissolved in pure water, and treated (drop by drop) with sulphuric acid of specific gravity 1.116 till the exact point of saturation was ascertained, by frequently testing with litmus paper. Towards the point of saturation a strong effervescence took place. The solution was neutralized after 96 grains of the acid test liquor had been used, which is equal to 10 per cent. of carbonate of soda.

This sample being very wet, the moisture was ascertained in the usual way, and amounted to 23 per cent.

This sample, or rather what is called *scum* in the list, is composed of

Sulphate of soda,	51	0
Muriate of soda,	14	0
Carbonate of soda,	10	0
Insoluble matter,	2	0
Moisture,	23	0
	100	0

Samples A Nos. 25 and 26, called good and superior salt in the list, when tested, gave traces of sulphate; with this exception the crystals are good and pure.

The conclusions to be drawn from the preceding details are somewhat at variance with the general impression regarding the *Sambhur* salt lakes. At least my own idea, derived from conversation with natives engaged in the salt traffic, was, that the lake water was a deep saturated brine, which left so thick a cake of salt on evaporation in the hot weather, that it was cut out in blocks on the margin and brought away on bullocks.

It would seem, however, that the shallow lake, or inundation would of itself, leave a deposit too thin to be profitably worked; and that it is customary to dig reservoirs or *kiyárs* wherein several feet depth of water already nearly concentrated to brine, are allowed to deposit their crystals on drying; or the evaporation is aided by the introduction of sticks, up which the saline incrustation rapidly creeps.

The velocity of the spontaneous evaporation under the fierce sun and scorching winds of the western desert, is well exemplified by specimens A 15, the *bacheh* or infant crystals of one day's growth, through 16, 17, 18, to 19, the 8th day's produce; in the last the crystals are cubes of full half an inch base. Again we find crystals of the same size in No. 22, from the evaporation of 8 out of 12 fingers' depth of water in 20 days of the hottest season. In No. 23 the crystals from 6 inches depth of water are of $\frac{3}{4}$ inch base. The *size*, however, of the crystals depends greatly upon the undisturbed continuation of the process, and does not give us a clue to the quantity of salt deposited from a given depth of water, whence we might calculate the saltness of the lake itself at various periods of the season. The rate of evaporation itself may be estimated from the above data tolerably well; thus—" 6 fingers in 8 days"—" 12 fingers in 20 days"—will be nearly *half an inch in depth per diem!* The pits dug for the reception of the brine seem sometimes to be very deep, 10 or 12 feet; in these when deserted the deposit proceeds for several years, forming solid strata of salt separated by a streak of earth washed in during the rainy season. The accumulation is then dug out in mass: but in general the salt for sale is collected as it forms in the brine pits in a granular state, by which means it is freed from the more soluble salts with which it is accompanied. The *pakká* salt of the *byopárís* or traders (Nos. 25, 26), is of a large grain—the latter indeed in half-inch crystals,—and not very clean.

A circumstance of chief importance elicited by Lieut. Conolly's specimens, is the presence of the carbonate and sulphate of soda in considerable abundance among the saline products of the *Sambhur* lake. The greater part of the substance described by the manufacturers as *refuse* or scum, which is stated to be thrown away as useless, turns out on analysis to be carbonate of soda, contaminated with sulphate and muriate; and it is well deserving of inquiry, whether the discovery of so extensive a store of *natron* in a state of great purity, may not be turned to profitable account. In all the strata cut from the neglected *kiyárs* the carbonate is seen overlying the mixed sulphate and muriate, of an efflorescent snowy consistence. Sometimes the formation of the salt is prevented by its abundance as (in A 4, 5, 6); No. 5, I find on analysis to contain 40 per cent. of carbonate, with 30 of each of the other salts—and a little care in separating the crystals of these would leave it nearly pure.

Spicular crystals resembling nitre are seen in some of the specimens (A 11); they bear a very small proportion to the general mass. It is but necessary to refer to Mr. Stephenson's examination of other specimens, to form a clear idea of the conditions best suited for the separation and collection of the different salts; thus in the old deserted pits (B No. 1), the sulphate is obtained nearly pure: in A 6, 10, it is mixed with carbonate; in A 5, the latter predominates. As for the muriate, from its inferior solubility, this salt is readily separated in a state of purity from the brine.

The small proportion of lime in the earthy residue of A 1, from the bed of the lake, rather militates against the expectation entertained by Lieutenant Conolly from native report, of a subjacent stratum of this mineral.

The points now wanted to complete Lieutenant Conolly's description of the *Sambhur* salt manufacture, and the questions naturally induced from the information he has already given, are :

1. A topographical account of the lakes, their extent, general depth, position relatively to adjacent plains, sands, or hills.

2. The extent of the manufacture, produce, possible increase, price, and other statistical data.

3. Whether the carbonate and sulphate are worked and used? the quantity and price of these.

4. The exact process followed by the native manufacturers or collectors.

5. The specific gravity of the water, both of the lake and of the brine pits, at different seasons; which may be found in the absence of the means of determining it on the spot, by bottling off a portion

at stated times. This would also enable us to ascertain whether the carbonate existed in the water, or whether it was formed during the evaporation, by the action of the lime or other earths. The presence of magnesia, of potash, and of iodine also remains an undecided point, as well as the nature of the pink or amethystine colouring matter remarked in some of the specimens (A No. 24).

To conclude this hasty note, I may mention that I have found M. Gay Lussac's alkalimeter a very convenient instrument for examining these mixed salts. By preparing three standard bottles of dilute nitric acid, nitrate of barytes, and nitrate of silver, adapted to his centesimally-divided dropping glass, the per centage of carbonate, sulphate, and muriate, is obtained successively from the same specimen with great ease and rapidity.

J. P.

X.—*Remarks on a collection of Plants, made at Sadiyá, Upper Assam, from April to September,* 1836. *By* William Griffith, *Assistant Surgeon, Madras Establishment, on duty in Upper Assam.*

The following remarks may not be uninteresting, as they concern a portion of India of which, especially so far as regards its natural productions, but little is known. I must beg, however, to point out that they must be considered as outlines only of a slight sketch; since the amount of plants collected in *Assam* does not probably exceed 1,500, and this can scarcely be considered more than one-fourth of its whole Flora.

The greater portion of *Assam* that I have seen, may be compared to an extensive plain, intersected in various manners by belts of jungle, the breadth of which, although extremely variable, does not, except towards the hills enclosing the valley, seem to be often very great. But as we approach towards the eastern boundary, the spots unoccupied by jungle become fewer and less spacious: so that between *Kujoo Ghat* on the *Noa Dehing*, and *Nungroo* on the *Booree Dehing*, and in the whole of that direction, the country is almost exclusively occupied by jungle. The characters of a plain intersected by narrow belts of jungle is very obvious about *Sadiyá*, at which place the collection was almost entirely formed.

The peculiar feature of *Assam*, especially its lower and central divisions, consists in the vegetation of its churs, or tracts of sand, very often of great extent, which are stretched along the *Burhampootur*. The breadth of these tracts, taken together, is, in some places, from 8 to 10 miles. They may be said to be throughout their whole extent exclusively clothed with dense grass jungle.

Up to *Rungpoor* the eye meets nothing but grasses, and an occasional Bombax, a tree remarkable for its ramification, the branches being nearly approximated in whorls, and forming right angles with the trunk. About *Buggooa Mookh* belts of jungle begin to appear, here and there approaching to the banks of the river. From this place upwards the belts increase in extent and number, and from *Seloni Mookh,* just below the confluence of the *Dihong* with the *Burhampootur* to *Sadiyá,* they proponderate much over the grassy tracts. Above *Sadiyá* these tracts recommence at least on the northern bank, but they disappear soon entirely: the grasses that clothe the churs are, especially throughout Lower and Central *Assam,* of gigantic size, some of them often measuring 20 feet in height. They consist of four or five species of Saccharum, the kuggra, mog, (white,) molaha, (red) and telee, (blackish,) of the Assamese, and a species of Arundo, which is perhaps the longest of all, the nul (or podomolee*) of the natives. Towards *Sadiyá,* however, very large tracts are covered with Imperata Cylindrica, the *ooloo-kher* of *Assam,* which grows to the height of 5 to 7 feet. As the genus Saccharum far preponderates over the others, and is perhaps during its inflorescence one of the most conspicuous genera of the order, the appearance presented by the churs during the flowering of their occupants, can be more easily conceived than described.

It may perhaps be convenient to consider the botany of *Assam* under the following heads.

I. Botany of the *Burhampootur,* including the churs.

Of these, Gramineæ form, as I have said, almost exclusively the Flora. Of the immediate banks, the predominant order is,—Compositæ, Polygoneæ, Scrophularineæ, Gramineæ, (among which is a species of Alopecurus,) Boragineæ, have several representatives: from *Jorháth* upwards to *Diboroo Mookh,* a large annual Ranunculus occurs extensively, and throughout the same distance large patches not uncommonly occur of a species of Irematodon, *(I. sabulosus, mihi,)* a species of Polentilla is also not uncommonly met with.

II. Botany of the plains.

Predominant plants, Gramineæ; of these the most common about *Sadiyá* are Imperata cylindrica, Saccharum spontaneum, Saccharum fuscum (Roxb.) in wet places, and a probably new, large and coarse species of Panicum. Among these may be found two or three Orchideæ, Polygoneæ, Leguminosæ, Cyperaceæ, one Viola, and a species of Exacum which is particularly conspicuous from its bright blue flowers

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* See BUCHANAN's *Dinájpur,* p. 168.—ED.

Those parts of the plains which have at a previous period been cleared for cultivation, but are now unoccupied, present the usual tropical features; and are occupied chiefly by Cyperaceæ, among which occur one or two Gramineæ, several annual Scrophularineæ, and small Alismaceæ.

III. Botany of the belts of jungle.

IV. Botany of the foot of the boundary hills.

On this last I am not able to offer any remarks. It will be found excessively rich in ferns, and next to these perhaps in Cyrthandraceæ. The only opportunity that has hitherto been allowed me of visiting any portion of these boundaries above *Gawahatti*, occurred at *Gubroo Purbut;* and I was then fortunate enough to meet with an Alsophila 30 feet high, a Sollyana, (mihi,) and Kaulfussia Asamica. Of the third division, the botany is very varied; so much so, that no one prominent feature seems to present itself. It is to this section that by far the greater number of species contained in the collection will be found to belong; and I shall hence pass in review the orders composing it—reserving the few observations I have to make on the most interesting plants to a subsequent part of this paper.

To those orders, the presence of which indicates the climate of northern latitudes, or of a tropical one at considerable elevations, I have appended an asterisk; and to those which, though usually tropical, include plants which have hitherto only been found at comparatively high elevations, I have appended a cross.

Dicotyledones.

*Ranunculaceæ,	3	Dipterocarpeæ,	2
*Magnoliaceæ,	1	Tiliaceæ,	5
Anonaceæ,	6	Elæocarpeæ,	1
*Umbelliferæ,	7	Lythrarieæ,	1
Araliaceæ,	3	Meliaceæ,	8
Ampelideæ,	15	Aurantiaceæ,	7
Onagrariæ,	1	Rhamneæ,	5
Loranthaceæ,	1	Euphorbiaceæ,	15
Alangieæ,	1	Hippocrateaceæ,	1
Melastomaceæ,	5	Malpighiaceæ,	2
Memecyleæ,	2	*Conariæ,	1
Myrtaceæ,	4	Tranthoxyleæ,	5
Cucurbitaceæ,	12	Balsamineæ,	5
Begoniaceæ,	1	Casyophylleæ,	4
*Cruciferæ,	3	*Rosaceæ,	6
Cappárideæ,	3	Leguminosæ,	41
*Violarieæ,	2	Connaraceæ,	2
Guttiferæ,	2	*Cupuliferæ,	2
*Temstrœmiaceæ,	3	Urticeæ,	24
Sapindaceæ,	3	Artocarpeæ,	18
*Hippocastaneæ,	1	Stilagineæ,	2
erculiaceæ,	1	*Chlorantheæ,	1

*Thymeleæ,	1	Acanthaceæ,	8
Proteaceæ,	1	Scrophularineæ,	20
Laurineæ,	6	Orobancheæ,	1
Amaranthaceæ,	5	Compositæ,	39
†Polygoneæ,	12	*Plantagineæ,	1
†Menispermeæ,	19	*Gentianeæ,	1
*Primulaceæ,	1	Apocyneæ,	8
Myrsineæ,	6	Asclepiadeæ,	9
Styraceæ,	3	Oleinæ,	5
Convolvulaceæ,	6	Jasmineæ,	2
Rubiaceæ,	36	*Boragineæ,	3
Lobeliaceæ,	1	Cordiaceæ,	1
*Campanulaceæ,	2	Ehretiaceæ,	4
*Sambuceæ,	1	Solaneæ,	6
*Viburneæ,	2	Gnetaceæ,	1
Cyrthandraceæ,	7	Incertæ sedis, including Roydsia,	31
Verbenaceæ,	11		
Labiatæ,	14	Total,..	523

Monocotyledones.

Scitamineæ,	9	*Junceæ,	2
Canneæ,	1	Palmæ,	3
Hypoxideæ,	1	Tupistra,	1
Amaryllideæ,	1	†Butomeæ,	1
Hydrocharideæ,	1	Alismaceæ,	10
Arordeæ,	3	Eriocauloneæ,	1
†Smilaceæ,	7	Gramineæ,	37
Dioscoreiæ,	2	Cyperaceæ,	28
Ponledereæ,	2		
*Orchideæ,	15	Total,..	126
Polamogeton,	1		

Acotyledones.

Equisetaceæ,	1	Filices‡,	34
Lycopodiaceæ,	5		
		Total,..	40

Of *Anonaceæ* I shall only notice Sphorostemma, Blume. In this genus the connectivum is highly dilated, and the cells of the anther at a considerable distance from each other; and yet from the *arrangement* of the stamina, bilocular anthers with contiguous loculi result.

It affords another instance of the existence of the peculiar tissue, until lately supposed to be characteristic of Gymnospermæ. In addition to this singularity, its medulla is traversed longitudinally by bundles of dense, occasionally branched, woody fibre, which consists of a superposition or "emboitement" of several layers.

Cucurbitaceæ. Among these plants occur two genera which appear to be new, so far at least as the Prodromus of M. De Candolle is concerned; in which book the article on Cucurbitaceæ, (by M. Seringe,) appears to me to be very unsatisfactory. Of one of the above genera, I have only seen the male; it is remarkable for the involute, or rather gyrate involution of the petals. The second I propose calling Actinostemma: it is chiefly remarkable for the complete separation of its stamina; for the "dehiscentia circumcisa" of the fruit; and, above all, for the pendulous direction of the seeds. It approaches in some points to Zanonia. I am not aware whether the peculiar nature of the arillus of this order has been explained or not; it is a separation of that portion of the tissue originally surrounding and in close contact with the ovula. Hence it is a shut sac; and hence, too, it is wanting in Actinostemma, in which the cavity of the ovarium is not filled by a production from the placentæ.

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‡ Chiefly from the foot of the Abor Hills, on the *Dihong.*

Conariæ. In Conaria, of which I have one species from the Abor Hills, the raphe is certainly external with regard to the axis. I have not been able to ascertain whether this depends upon any torsion of the funiculus, which Mr. Brown has stated to be the case in other instances of a similar anomalous situation.

Of *Saururceæ* Houttuynia is the only example. This plant, which was originally described by Thunberg, appears latterly to have been more misunderstood than by the original describer. I have had no opportunity, however, of examining the work of Thunberg in which the plant is described. And I ought, perhaps, to except M. Meyer, who has published "De Houttuynia atque Saururcis," with which work I am unacquainted. I find each flower throughout the spike, except perhaps the terminal one, to be subtended by a very small bracte. Of these, the four lowermost, rarely only three, are highly developed and petaloid, forming the spatha.

The number of stamina to each flower is, excepting those at the apex of the spike, almost invariably three, and always equal to the carpella entering into the formation of the female organ; and of these the third is always next the axis. The terminal flower has from five to seven stamina; the space between this and the uppermost triandrous hermaphrodite (?) flowers is occupied by an assemblage of male flowers, with a variable number of stamina, but never greater than three, and usually, I think, two. That such is the structure of this portion is proved by the presence of bractea, similar to those of the lower portion, interspersed among the stamina. Dr. Wallich says, in Flora Indica, I. 362—"In the numerous spadices which I have examined, I have with Father Loureiro invariably found three staminas, and as many styles attached to each ovarium: the former above the base, the latter at the apex of its angles. I have not, therefore, hesitated continuing this most interesting plant in the very class and order where it has been placed in the Flora of Cochinchina. As there is no reason for considering it at all different from the original *Japan* plant, I am at a loss to account for the difficulty which the celebrated Chevalier Thunberg experienced in determining its station in the sexual system; nor can there be at present any doubt of its neither belonging to Heptandria, Polyandria, or Monæcia." THUNBERG was, however, so far as I can see, right; for he paid, in all probability, exclusive attention to the composition of the terminal flower, on which, in certain cases, the Linnæan rules lay much stress. Taking this into consideration, Houttuynia may be referred to Heptandria, Polyandria, or Monæcia; most correctly to the latter, and least correctly to Polyandria. But as,—so far at least as regards the Linnæan system,—the most obvious characters are the best, it is advisable to keep the plants still in Triandria Trigynia The structure of the seed has been likewise totally mistaken. In the Flora Indica, loc. cit. the embryo is placed at the wrong end of the albumen, and is mistaken for the embryonary sac. The real embryo is a much more minute organ contained in this, " the vitellus," or membrane of the amnios of Mr. BROWN. Dr. HOOKER describes Dr. WALLICH's account as most correct; but he does not define the situation of the embryo otherwise than by saying that it is situated at one end of the seed. Lastly, the plant does not belong to Aroideæ, nor even to Monocotyledones. Notwithstanding the apparent solidity of true embryo, yet the more important nature of the structure of the stem is sufficient to point out that it is Dicotyledonous, or rather Exogenous; and among these, its true place is, beyond doubt, Saururceæ.

Of *Thymeleæ* one species only occurs, which is apparently referrible to no published species of the order. To this I have attached the MSS. name of JENKINSIA, in compliment to Captain F. JENKINS, Agent to the Governor General on the North-East Frontier, to whom Botany, among other sciences, is considerably indebted.

Of *Menispermeæ* the majority are interesting. Cissampelos is the only genus with which I am acquainted, in which the ventral suture of the ovarium is anticous, or not next the axis. I am not certain whether the most correct way of understanding the curious structure of the female flowers is not to assume the aggregation of four flowers, which, in the only species I have examined, appears constant, as a complete quaternary division of one only. It remains to be ascertained whether the singular reversion of the situation of the ventral suture is more uncommon in aggregate than in solitary carpella.

Of the genus *Stauntonia*, *Assam* has two species, but only one is contained in my collection. The anomalous structure of the fruit has no doubt been explained by Dr. WALLICH in his Tentamen Floræ Nipalensis, in which it is published under the name Holböllia, but which I am at present unable to consult. I find that the placentation of this genus is similar to that of Flacourtianeæ, with which order I am not acquainted, and to that of Butomeæ; and hence the anomalous situation of the seeds. At the period of expansion of the flower, the ovula are much less developed than is almost universally the case: they present indeed the appearance of ovula at the earliest stages of development. I refer to this order a plant with long racemes of ternarily aggregate fruits, notwithstanding that it has milky juice, and that the Cotyledons are large, foliaceous and obliquely situated with regard to each other.

Among the *Cyrthandraceæ* a species occurs, (Chiliandra obovata, mihi,) remarkable for the structure of its mature anthers. These dehisce in a labiate and incompletely bivalvular manner, the lower and smaller valve being alone half reflexed. This valve is compound, and due to the mutual adhesion of the originally distinct inner locellus of each loculus. To this formation I have adverted in a short memoir on Rhizophoreæ, published in the Transactions of the Medical and Physical Society of Calcutta, although I was at the time ignorant of the existence of an example. *Assam* contains another interesting species of this family: this, which is remarkable for its pentangular petaloid calyx, and the " dehiscentia circumcisa," of its fruit, in which it approaches to Aikinia of Mr. Brown, I propose calling Cyananthus.

Scrophularianeæ afford one new genus, (Synphyllium torcnioides, mihi,) an account of which will appear in the Journal of the Madras Literary Society, edited by my friend Mr. Cole.

Asclepiadeæ contain some interesting species, of which one constitutes probably a new genus, unless, indeed, it is referrible to Dr. Wight's Heterostemma, from which it would appear to differ in the valvular æstivation of the corolla. This species is remarkable for the aliform processes running along the larger veins of the under surface of the leaves.

To this order, or to Apocyneæ, is to be referred a remarkable plant, distinguished by the numerous longitudinal foliaceous alæ of its follicles, and, I speak from memory, its serrated leaves. This plant, which I have seen near *Mergui* on the *Tenasserim* coast, seems to have been sent by Captain Jenkins to Dr. Wallich with many others, none of which appear, however, to have excited much attention.

Among the *Boragineæ* we find one Myosotis and a species which, with the habit of some Anchusæ, appears to be not referrible to any genus of the order. The " umbilicus" occupies the centre of each carpellum, and is surrounded by an osseous elevated margin. The origin of this is totally distinct from that of Myosotis, and is wholly independent of fecundation. The radicle is in addition inferior.

The Monocotyledonous forms are chiefly those of other parts of India. Among the *Orchideæ* two species of Calanthe, and two of Pogonia occur, as well as one species of Spiranthes. Among the Gramineæ the most interesting is a Diandrous species of Alopecurus, which genus is, I believe, new to India; at least to any portion of the plains.

Of the Cyperaceæ, I shall only advert to the existence of four species of Carex, two of which are, however, from the Abor Hills; a third, which was originally sent by Captain Jenkins to Dr. Wallich, appears to be widely distributed, extending from *Gawahatí* to *Jorháth;* the fourth; I have only met with about *Sadiyá.*

But perhaps the most interesting plants of the whole collection are contained among those " incertæ sedis," a division, always to a beginner, of great extent. Most of these are from the lower ranges of the Abor Hills; and the appearance of these is quite sufficient to ensure their being of great interest.

XI.—*Note on a Remnant of the Hun Nation.* [*Vide Chap.* 26 *of the* " *Decline and Fall of the Roman Empire*" *under the head of* " *Original Seat of the Huns.*"] *By Captain* W. Foley.

" One of the princes of the nation *(Hun)* was urged by fear and ambition to retire towards the south with eight hordes, which composed between forty and fifty thousand families; he obtained under the title of 'Tanjou' a convenient territory on the verge of the Chinese Empire." (A. D. 48.)

Now, there are a people located in various parts of the *Bama* (Burmese) and *Shan* (Siamese) empires, who are distinguished by the appellation of " *Ton-soo*" or " *Ton-dzoo* :" they have a language of their own, and differ in feature, dress, and domestic manners from the inhabitants of the country in which they reside; they never intermarry with their neighbours, and assert their descent from " *a people who came from the north ;*" they are an ugly, swarthy race; both men and women closely resembling the picture of the *Huns* drawn by Gibbon in his immortal history. Broad faces, flat noses, small eyes, short, squat (but athletic) figures, are the most prominent beauties. The men wear their hair long in common with the *Bama,* but their dress, which is always of a dark colour, much resembles the garb of the Chinese: the women have a fillet of dark-coloured cloth (generally with a red or white border) tastefully arranged as a head-dress, and falling down over the back; a mantle of the same colour and material extending from the shoulders to a little beyond the knee, is the only remaining garment. Their legs, which are extremely thick, are covered with a number of metal bangles; these, with the exception of the ear-ring (*nad-dán*) are the only ornaments worn by the females of the *Ton-soo* race.

I am persuaded that these people are the descendants of the "TANJOU" described by GIBBON, a *remnant of the ancient Huns!!* preserved during a lapse of 1788 *years* uncontaminated with the blood of strangers!!

Turning over the pages of GIBBON very lately, I happened to notice the subject. I regret exceedingly that I was not aware of this singular coincidence during the time of my temporary residence in the neighbourhood of this people—how much might have been elicited!

XII.—*Table shewing the breadth of the river Satlaj and the rate of its current at different stages from Harrike Pattan to its junction with the Indus at Mithankot.*

[Communicated by Capt. C. M. WADE*.]

Names of the Stages.	Breadth of the river Satlaj.	Rate of the current.	
	In yards.	Kts.	Ft.
At Harrike, ...	352	1	32
,, Bundáli, ...	220	1	24
,, Firozpúr,.......	308	1	32
,, Mamdot,.............	528	1	30
,, Khúrbei, ...	154	1	20
,, Karrınn, ...	220	1	22
,, Ladúke, ...	308	1	40
,, Jagvairá Salemká, ...	264	2	00
,, Juwunda Bángá,.....	154	1	13
,, Chúnní, ...	418	1	35
,, Bachawalí,...........	264	1	13
,, Jhúlná, ...	484	1	41½
,, Akoki,...............	572	2	00
,, Khaja Bazídpúr.	198	1	41
,, Núnkeh,.............	266	2	00
At Pala,................	306	1	05
,, Núrpúr, ...	360	2	03
,, Khyrpúr,.............	381	1	34
,, Núr Mohamad kí goth,	176	1	04
,, Gúldera, ...	303	1	30
,, Bahawalpúr, or Bindríwalá,............	616	1	06
,, Náharwalá,...	220	2	01
,, Buddúke, ...	308	2	00
,, Mírpúr, ...	572	1	04
,, Makkhanbelá, ...	605	2	00
,, Sítpúr,....	577	1	40
,, Shydaná, ...	572	2	01
,, Mithankot, ...	858	1	13

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* We were in hopes ere this to have been favored with a copy of Captain WADE'S journal and survey of the river *Satlaj*, for publication. Specimens of the soil and rocks on the banks have been long in our possession, awaiting further illustration, which want of leisure has doubtless prevented.—ED.

TABLE, No. 2.

Shewing the distance of the Stages in Miles, and the Soundings of the River from stage to stage.*

Names of Stages.		Sounding.	Av.
From Harríke to			
,, Bundálí to	13	14 feet.	
,, Firozpúr to	10	10,8,12,16,12,11,12,10,11,9,12,14,12.	10½
,, Mamdot to.......	14	11,12,14,14,14,12,12,6,5,6,6,7,8,12,11,14,6.	10
,, Khúghgí to	13	8,8,12,6.6.6,6.5,13.8,5,5,5,12,14,10,	8
,, Karrían to.......	9	10,18,16,22,11,10,11,9,12,2,	13
,, Ladúke to.......	13	12,12,12,9,9,7,14,12,9,11,15,6,15,11,15,8,7,15,17,14.	11½
,, Jagvairá to......	23	7,6,5,13,5,12,10,12,18,22,14,9,20,9,12,14,12,22,11, 10,14,14,6,6,14,10,11,5,3.5,10.	11
Juwunda Búngá,	8½	14,14,14,6,6,14,10,5,5,5.	9
Chúnni to	11	8,10,14,10,12,9,12.9,10,8,7,7,13,6,12,12.	10
Bachawalí to. ...	13	8,11,13,12.9.7,6,6,3,5,8,12,12,14,14,8,8,8,6.	9
Jhúná to	16	8,8,9,9,6,14,15,14,8,7,12,16,11,16,15,15,16,12,12,14, 9,11,6,7,6,6.	10¾
,, Akokí to	13	6,14,14,15,12,9,11,11,11,11½,8,9,10,7,18,14,18,13.	11¾
,, Khajh Bazídpúr,	15	12,12,9,8,6,7,6,5,9,11,13,12,8,7,6 6,6,5.	8½
,, Núnkeh to	12	5,4,6,7,11,12,14,3,3,3,3,4,7,11,11,24,4,4.	8
,, Pala to	13	14,14,11,7,16,12,8,11,8,8,9,9,6,7,12,13,18,11.	10¾
,, Núrpúr to	24	11,16,9,7,6,7,13,14,15.6,7,9,20,8,6,8,7,8,12,14,15,6, 7,9.15,9,10,10,11,7,14,16,16,16.	11¼
,, Khyrpúr to	20	7,10,6,11,12,18,14,12,18.9,16,12,11,12,11,6,8,12,11, 7,5,12,10,11,11,9,14,11,13.	10¾
,, Núrmohamad, ..	10½	9,11,14,15,14,15,11,11.12,16,7,6,15,8,7.	11¾
,, Gúldera to	12	7,5,11,6,7,11,16,9,12,18,19,11,11,9,7,20,8.	11½
,, Bahawalpúr to ...	11½	11,9,8,16,18,13,9,13,14,18,18,8,9,12.	11½
,, Náharwalá to ...	11	12,13,7,12,11,9.6,9,8,7,6,9,12,18,9.	10
,, Budduke to	5½	9,12,16,16,13,7,6,14.	11½
,, Mírpúr to	14	7,6,14,17,16,13,7,11,20,16,12,13,14,12,12,18,12,11, 14,12.	16
,, Makkhanbelá, ..	13	9,7,15,9,7,9,12,19,15,9,18,14,18,24,21,19.	14
,, Sítpúr to	10	14,11,17,18,14,12,14,18,7,9,12.	13
,, Shydaná to	14	24,24,15,13,14,9,14,17,24,12,12,12,12,12,12,13.	15
,, Mithankot,......	15	11,9,8,14,12,12,13,24,17,12,13,14,17,18,15,24,27.	14

TABLE, No. 3.

Shewing the distances both by water and land from Ropar to the principal towns on the Satlaj as far as Mithankot.

Names of places with their distance from Ropar.	Akbari Kos.		Statute Miles.	
	By water.	By land.	By water.	By land.
From Ropar to Lodiáná or Filor Ghát,	37	32	46½	40
,, Ditto to Harríke,...	86½	77	108½	96
Ditto to Firozpúr, ...	104	95	132½	119
Ditto to Mamdot, ...	118½	105½	148½	132
Ditto to Gaurjíáná, ...	174	149	210½	186
Ditto to Fatehpúr, ...	274	224	342½	282
Ditto to Bahawalpúr,...........	307	248	385	313
Ditto to Cuch,	346	277	433	337
Ditto to Mithankot, ...	381	310½	476½	388

* These soundings were taken between the 1st of Jan. and 7th of March, when the river is at its lowest depth throughout.

XIII.—*A Comparative view of the daily range of the Barometer in different parts of India. By* James Prinsep, *Sec. As. Soc. &c.*

The friends who have for the last two years favored me with copies of their Meteorological Registers, have doubtless accused me of a most ungracious requital of their labours, in the long slumber to which they have apparently been devoted in my editorial escrutoire! Such is not absolutely the true state of the case; but the number attached to the accompanying plate* will, I fear, testify against me to the extent of having kept back for nearly a year, the curious facts that had been elicited from the possession of so many valuable records of the weather.

The fact is, that the prompt attention with which my appeal was answered by observers of the weather in numerous parts of India, served as a check to the immediate publication of the materials supplied. The very voluminous dimensions of such registers, and their dry and unperusable nature, even by the few who would like well to consult them, set me about contriving some method of condensing their results into convenient compass, and exhibiting them to the eye in a manner more perspicuous than could possibly be accomplished by a mass of mere figures.

The usual form of a diagram of zigzag lines from point to point would apply tolerably well to a series of single daily observations, taken at a particular hour, and would trace out in a gently undulating curve, the course of annual variation; but if made to embrace the double daily oscillation, now well known to be steadily pursued by the Barometer in intertropical climates, it was evident that the alternations would be too confused on a small scale to be followed pleasantly by the eye. A slight modification suggested itself, as calculated to remove all objections to this mode of displaying the phenomena, without taking in any degree from the accurate notation of the fixed points of observation, while it represented more palpably the amount of daily oscillation. The modification to which I allude will be readily understood by inspection of Plate XIV. It consists in breaking the connection between the consecutive days, and merely laying off, in short parallel lines, the interval between the maximum and minimum readings of the instrument. The proximity of the lines enables the eye to fancy an imaginary line drawn centrally through them to represent the mean course, without the necessity of drawing it, while errors of the tenth of an inch, so liable to occur, and so difficult of detection in a series of figures, became at once obvious and remediable. The chief

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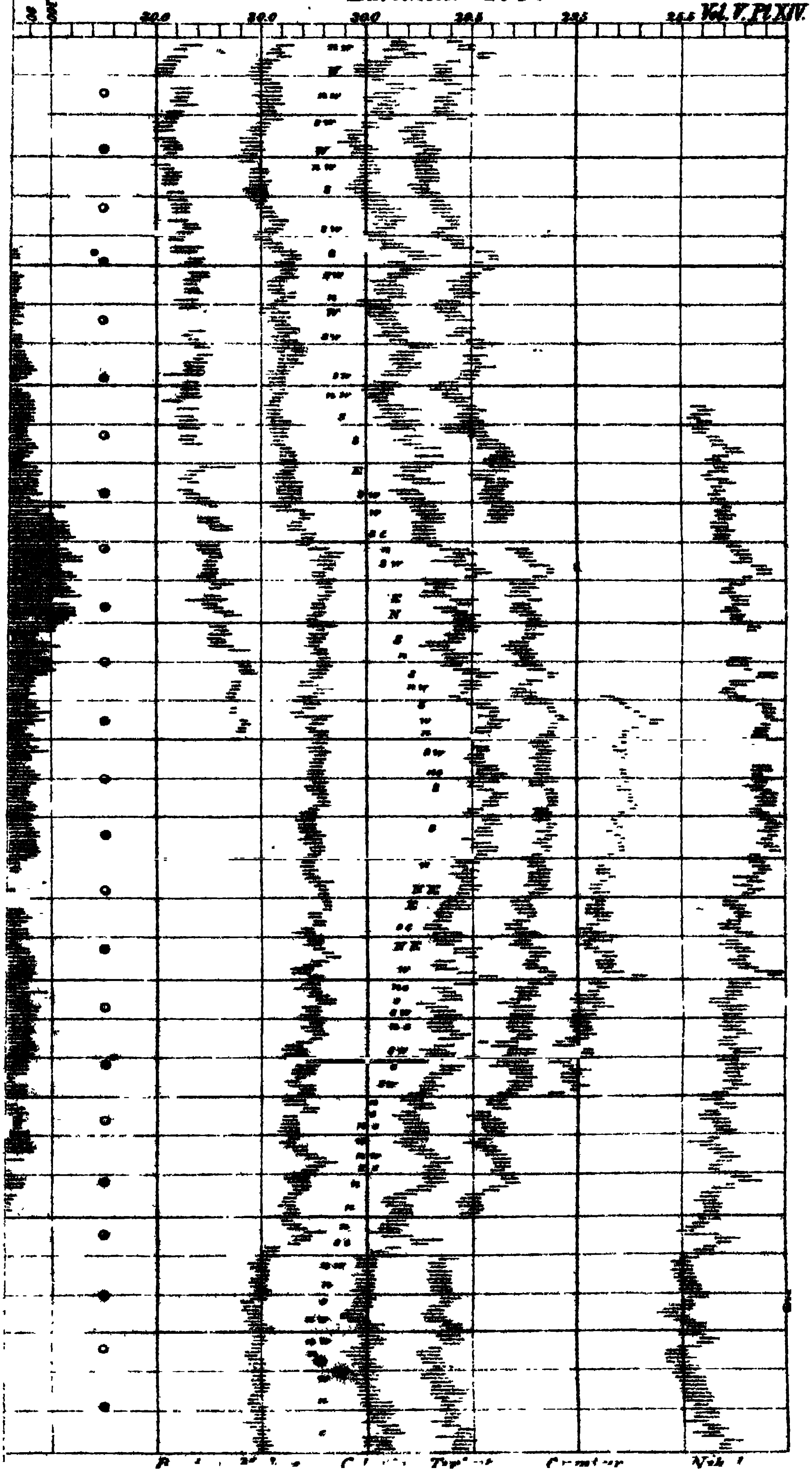
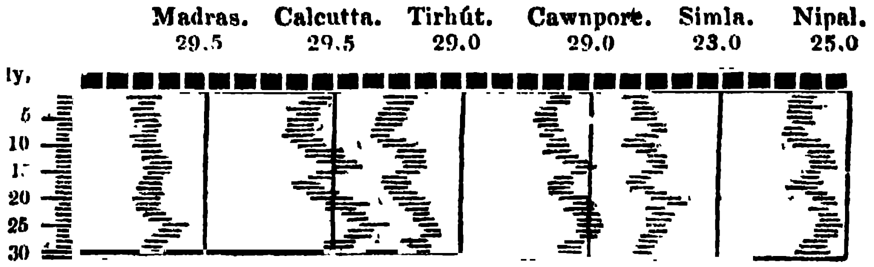
* It was first printed as Plate IX. subsequently altered to XIV.

Barometer 1835

Vol. V. Pl. XIV.



advantage, however, of the plan of parallel lines was, that type might be adapted to express the observations with as much facility as to a figured statement. Having the brass rules of my calendric scales already divided according to the days of the year, it only would be requisite to cast a quantity of rules of the thickness of one day, and exactly one-tenth of an inch in breadth; the printing surface of some being retained of the full length, and that of others reduced successively one hundredth, two hundredths, three hundredths, &c., so that nine varieties, and a large supply of blanks or quadrates of the same dimensions, would be sufficient to lay off any series correct to the hundredth of an inch, which is ample for most purposes. I here give a sample of this mode of registry in type, although, as I had previously engraved a copper-plate divided for the purpose, I have not, on the present occasion, made any use of the typographic plan, in spite of the far greater expedition and precision of which it is capable.



It is merely necessary to denote by figures at the top, the value of the neutral line from which each set of readings is to be estimated right and left, in some even division of the inch, as 29.50 inch for *Calcutta*, 29.00 inch for *Tirhut*, or 25.00 for *Nipal*, &c. To reduce the lines into figures when requisite, an ivory inch scale may be applied, but this will seldom be necessary if such linear tables are accompanied by monthly abstracts in the ordinary form: the chief advantage of the lines being to shew at a glance the variations of pressure or other phenomena, during the month, in a very small compass, and for many localities at the same time.

Having thus explained the principles upon which the accompanying plate was filled up,—a work of no small patience by the way, seeing that it contains 13 columns of 365 double entries, or nearly 10,000 individual measurements laid off by scale to the hundredth of an inch,—I will proceed to notice, first, the authorities whence the various columns are derived; and, secondly, the instructive and highly curious facts it discloses.

The *Madras* column is extracted from the registers published by Mr. Taylor, the H. C.'s Astronomer at *Madras*, in the Journal of the Literary Society at that place. For the *Bombay* column I am indebted to my brother Assay Master, Mr. Noton, who kindly sent me copies of some registers made mostly during his absence. The series is broken in many places, and the observations between June and October, 1834, were evidently taken by an inexperienced hand. The single line marked *Socotra* is from the register kept by Captain Haines while engaged in the survey of the island. As the hours chosen by him were not those of the maximum and minimum, I thought it best to confine myself to the noon readings as a mean of the day. The *Calcutta* columns are taken from my own registers, published in this Journal. The *Tirhût* diary was kept at my request by my cousin, the late Mr. Thomas Dashwood, Judge at *Mozafferpur*, who kept it up unremittedly for three years and a half, indeed until a very few days before his sudden and lamented death*. One year of this series has already been published at length in the 2nd and 3rd volumes of the Journal. For the *Cawnpore* register I am beholden to Colonel G. Pollock, C. B. of the artillery. This series is unfortunately intermittent, from his having been obliged to send his barometer to *Calcutta*, in December, 1834: which, however, furnished an opportunity of comparing it with my own standard. A little to the right of the *Cawnpore* line for 1834, are entered the observations of Mr. Ritchie at *Bancoora*, for April and May, also abruptly terminated by his falling an untimely victim to the climate.

The last series to the right I owe to Captain Robinson of the *Nipal* Residency; it was made partly with his own and partly with Mr Hodgson's instrument, which will account for the shifting of the index point in June, 1834. In March also two adjustments were attempted by boiling the tube. These do not affect the utility of the register, when once noted. Captain Robinson's tables are invaluable from the number of periods during the day they embrace, but these will be alluded to hereafter in summing up the figured abstracts.

I was disappointed of getting any observations from the western hills, (the seat of the grand trigonometrical operations still going forward in those parts,) until after the plate had been long finished and the whole edition struck off, when Mr. H. S. Boulderson of *Moradabad* kindly transmitted me a file of observations taken by his brother, Mr. S. M. Boulderson, at *Simla*, between May and November, 1834. Rather than lose the valuable additional evidence which this register, at a position elevated about 7000 feet, and situated 400 miles to the west of *Katmandhu*, would afford, I have caused it to be

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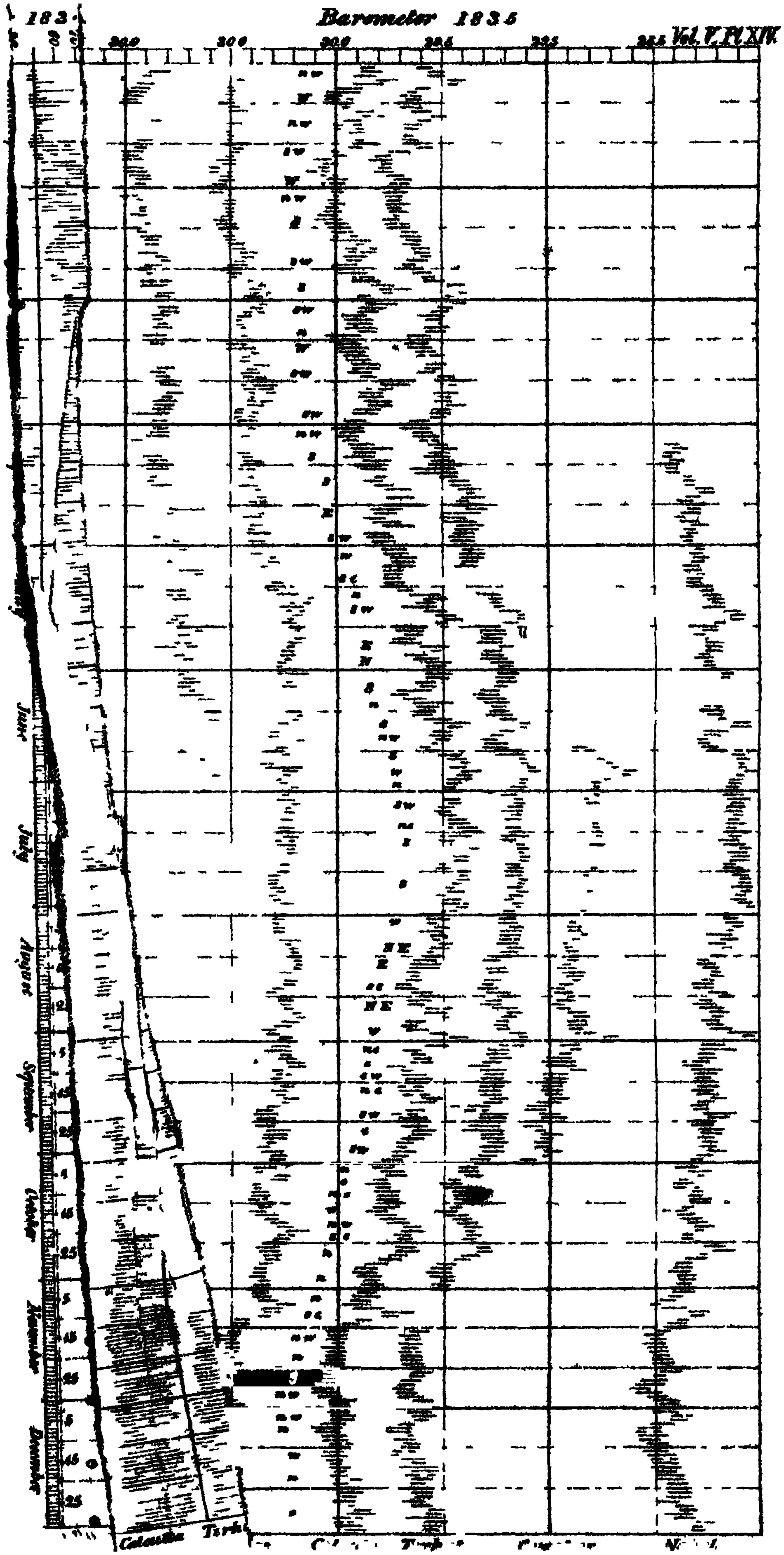
* An apoplectic fit terminated his life of exemplary public service and private worth, at the very moment of his quitting employment, and retiring home to devote his latter days to the education of his family in England.

Barometer 1835

Vol. V. Pl. XIV.



inserted, under the *Bancoora* column, heading the index line 23.50, to correspond with the average range of the barometer at *Simla** and have reprinted the plate.

The first feature in the table that attracts attention is an almost perfect parallelism in the march of the barometer at *Calcutta, Bancoora, Mozafferpur, Cawnpore, Nipal* and *Simla*—places situated many hundred miles asunder from 22½° to 28° north latitude, and 80° to 88° east longitude, with altogether differently prevailing winds and climates, and opposite geographical features. The same parallelism continues even as far south as *Madras*, but the *excursions* are there much subdued in every respect, and occasional deviations are observable, which seldom or never occur in the three Gangetic lines, except from such a local hurricane as that experienced in the immediate neighbourhood of *Calcutta* on the 3rd August, 1834. Between *Bombay* and *Calcutta*, little conformity of detail can be perceived, though the general direction is symmetrical. There is, however, considerable accordance between *Bombay* and *Madras*, the former having from its higher latitude a wider range of oscillation, both annual and intermediate.

The direction of the wind (at least of the lower stratum) alone seems quite insufficient to account for the barometrical variations, although it is generally true that the mercury rises with the prevalence of northerly, and falls with that of southerly winds, as might be expected from the different specific gravity of a warmer or colder atmospheric column. That the moon also has no regular influence appreciable on the scale of my table, must be, I think, also granted; for as many instances occur of a falling as of a rising barometer at the changes of lunar phases. The course of the thermometer, on the contrary, seems to have a decided connection with that of the barometer. This is exemplified in the comparative uniformity of the *Madras* line, and the increased curvature at other places. For convenience of division I assumed the tenth of an inch, as representing 10 Fahrenheit degrees of temperature. Had I taken double that amount, the general thermometric curve for the year would have been nearly symmetrical with that of the barometer, except during the rainy season.

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* Having the former copy of the plate at hand, I have distributed it detached along with the other, hoping it may attract notice and procure me a fuller collection for some future year.

I have been also favored with a daily barometrical series for 1836 at *Bangalore*, by Dr. Mouat, but I have reason to think that the instrument used was sluggish in its movements. I trust, however, for the ensuing year, the labours of this zealous observer will be made available by the possession of better instruments. I have further many other broken series from *Assam, Kyouk Phyoo, Candy*, &c. but they are generally wanting in the barometer. A short series was also kept for me by Lieutenant Montriou, I. N. at the head of the bay in January and February, 1833.

It should be remarked, that the daily undulations of temperature for *Calcutta* and *Tirhút*, are the extremes indicated by a register thermometer exposed to night radiation and noonday sun: those for *Madras* are only the variations of morning and afternoon heat in the shaded air. They both, however, but the former more distinctly, shew to the eye the influence of clouds and rain in diminishing the diurnal excursion; and in this respect a direct accordance is also observable in the reduced diurnal motion of the barometer; as I long since pointed out to be the case in regard to the *Benares* tables published in the Asiatic Researches, vol. XV.

Another material point to be noticed in the plate is the gale of the 3rd of August, when the *Calcutta* barometer dropt down to 28.8 inches passing (on the plate) through the *Tirhút* column, which is only partially affected. There is in all the lines a decided fall at the same period, but only of an ordinary extent, apparently unconnected with the disturbing cause of the *Calcutta* storm. Any who have witnessed the gathering of a north-wester during the calm serenity of a sultry evening, and have watched the turbulence of the clouds and commixture of upper currents prior to the sudden and furious generation of the whirlwind below, will be prepared to consider the hurricanes and gales of longer duration as equally insulated in their origin, only upon a much larger scale of operation. A sudden condensation of aqueous, or perhaps of gaseous matter, whether by electricity or simple cold, would, by drawing upwards toward the vacuous space, the under air, cause a fall in the barometer as certainly as if there were an absolute removal of superincumbent weight, for which there would be no mode of accounting; and this upward current could not take effect without the production of a horizontal current of corresponding degree and velocity.

The last point of instruction to be gained from the present plate,—and it is a very important one,—is the reliance that may be placed on the measurement of barometrical altitudes taken by comparing the observed height at places so distant as *Cawnpore*, or in the mountainous regions of the *Himálayas* with the register of a stationary instrument at *Calcutta*. I confess I always had misgivings on the comparability *inter se* of such distant readings, until as it were my hand refuted the doubts of my mind. The engraving shews that a dozen contemporaneous observations (that is, observations not made at the same instant, but at the same relative hour), would be ample for fixing the altitude of a place within moderate limits. Moreover, it shews that no reference of an observed height to a fixed unit (as 30 inches), assumed as the barometric zero at the level of the sea, can possibly be trusted: hence the advantage of maintaining a constant register at one or several fixed spots; nay, it may be almost regarded as a public desideratum, where, as in India, the Government has so much to learn of the physical geography of its vast territories.

Want of space has prevented my including in the plate the thermometric columns for 1835; but the temperature does not require such minute discussion as the pressure, for obvious reasons. The hygrometrical phenomena also are rather unsuitable to graphic illustration. The monthly averages to which we must now pass will, it is hoped, be sufficiently comprehensive in these departments to cause no regret at the unavoidable suppression of the daily registers.

Beginning, then, with the Bombay and Socotra series we have the following

Abstract of Bombay Observations for part of 1834, *by Mr.* Henderson: *for* 1835, *by Mr.* S. Frazer.

	Barometer uncorrected.			Thermometer.		
	10 A. M.	Noon.	3 P. M.	10 A. M.	Noon.	3 P. M.
1834.						
January, .	30.06	30.03	29.98	76.5	77.5	79.2
February, .	30.03	30.00	29.95	77 2	78.7	80.0
March, ..	30.01	29.97	29.93	79.5	85.5	82.0

	Barometer reduced to 32°.			
1835.				
January, .	29.974	29.939	29.889	.. Sunday Obs. carent.
February, .	.898	.907	.853	.. ditto.
March, ..	.575	.837	.788	from 12th to 16th carent.
April, ...	.890	.851	.790	16 to 20 ditto.
May, ...	.779	.752	,736	2, 3, 8 to 10 ditto.
June, ...	.662	.639	.612	
July, ...	.610	.605	.579	
August, ..	.668	.663	.630	
September	.730	.727	.626	
October, ..	.823	.786	.729	} 30th Oct. to 3rd Nov. carent
November,	.985	.941	.900	
December,	.980	.957	.902	from the 25th carent.
Means, ..	29.824	29.800	29.753	

Mr. Noton, fancying I was only in want of the barometrical series, has omitted to send that of the thermometer or of the weather in general. His own observations for many years on the climate of Bombay are, however, published, and will supply the deficiency when we come to take a general review.

Abstract of Observations taken on the coast of Socotra, on board the H. C. S. Palinurus, H. B. Haines, *Commander, in* 1834.

Month.	Barometer at 32°.			Thermometer.			Wind.	Weather.
	8 A.M.	Noon.	8 P.M.	8 A.M.	Noon.	8 P.M.		
January, .	29.429	29.416	29.414	76.7	80.7	79.4	ENE.	cloudy, 7 days rain.
February, .	.405	.396	.395	77.2	80.5	78.5	ENE.	hazy and squalls.
March, ..	.393	.377	.370	75.5	81.0	80.9	NE.	calms—clear.
June, ...	.093	.087	.077	86.9	91.5	90.0	SW.	hard gales.
July, ...	.089	.082	.082	84.0	87.0	86.2	SW.	hard gales.

The last two months' journal contains also the readings at 4 A. M. sunrise, 3 P. M. and sunset; but necessarily on board a ship in heavy weather, the diurnal oscillations cannot fairly be estimated.

We may now pursue the same course with Mr. Dashwood's tables for *Tirhút*, from December, 1833, (prior to which they have already been inserted,) first only reducing the barometric altitudes to 32°. Mr. Dashwood, following my recommendation of tapping the tube before reading off, has, as I expected, made the daily oscillation considerably greater than in his first register. Thus also my new standard barometer is found to oscillate full a fifth more than the old, so that the real external change of pressure during the day is hitherto only approximately known, and may perhaps be nearer 1½ than 1-tenth of an inch.

Monthly Abstract of Meteorological Observations, kept daily at Mozafferpúr in Tirhút, from the 1st December, 1833, *to the* 31*st May,* 1836, *by the late* Thomas Dashwood, *Esq. C. S.*

Month.	Barometer reduced to 32°.		Thermometer in doors.		Thermometer outside.		Winds Number of days.					Weather.
	9¾ A M inch.	1½ P M inch.	A M	4½ P M	Max.	Min	W.	E.	N.	S.		
1833.												
December,..	29.662	29.57	62.0	64.1	70.1	54.8	18	13	0	0	8	fogs and showery.
1834.												
January, ..	29.670	29.57	58 0	61.0	68 5	48.5	20	10			0	clear, cold.
February, ..	29.620	29.53	64 6	69 2	75.5	56	14	12	1	1	1	fair, changing.
March, ...	29.550	29.43	72	76.4	85 4	63	16	14	1	0	2	W. in day, E. at night.
April,......	29.470	29.36	77.	78 6	91 2	69.4	11	18	1	0	0	do. 4 northwesters.
May, ...	29.281	29.19	84.2	85.5	103.6	75.3	0	31	0	0	3	wind strong at night.
June, ...	29.20	29.13	8[illegible].	85.4	95.4	76.8	1	29	0	0	14	Cloudy and squally.
July, ...	29.252	29.16	84.0	85.6	92.3	77.7	0	30	0	0	15	earthquake on 11th.
August,...	29.280	29.19	83 8	85 4	90 3	77.9	7	21	2		12	changeable.
September,	29 373	29.26	83	81.7	89 8	73.0	3	20	0	0	10	fair, earthquake.
October,...	29.52	29.45	79.5	81.0	85.	74.0	9	9	0	0	10	gale on 4th, wet, fine.
November,.	29.72	29.62	71.5	74.0	75.	57.	23	5	2	0	0	fine, clear.
December,.	29.762	29.66	66.1	67.8	70.7	53 6	21	10	·	0	3	hazy, fogs in morn.
1835.												
January,...	29.775	29 68	59.5	63.1	65.5	44.5	22	9	0	0	1	do. clear days.
February,	29.761	29 67	65.0	69 6	72.8	52.8	12	15	0	1	4	4 squalls, fine.
March, ...	29.675	29.60	71.8	76.5	85.0	57.7	25	4	0	0	2	cloudy, fair.
April, ...	29.659	29.52	78.4	80.2	93.9	66.6	14	16	0	0	4	frequent squalls.
May, ...	29.472	29.36	82.4	83.7	95.3	74.1	5	26	0	0	4	several storms.
June, ...	29 377	29.3	83.0	84.6	93.9	74.1	0	29	0	1	10	very heavy hail 14th.
July, ...	29.331	29.2	81.9	82.	88.8	73.9	10	17		0	21	constant rain.
August, ..	29.399	29.3	82.8	84.1	88.2	73.1	12	17		0		3 storms, fair.
September,	29.494	29.3	81.5	83.	86.8	71.3	3	25	1	0		6 northwesters, fair.
October,..	29.605	29.5	78.1	80.	82.0	64.8	18	11	2	0		light winds, fair.
November,	29.829	29.7	67.8	71.7	72.4	53.6	16	5	1	0		clear, 1 fog.
December,	29,772	29.6	61.0	64.6	68.4	47.0	13	18	0	0		heavy fogs, 1 squall.
1836.												
January,.	29.775	29.6	56.8	60.6	65.1	41.4	21	10	0	0		natural ice 3 nights.
February,	29.697	29.5	61.8	65.5	72.2	48.3	12	17	0	0		changeable, fair.
March, ..	29.499	29.3	73.6	77.2	86.5	60.	7	14	2	0		fair, 2 storms.
April, ...	29.409	29.29	78.9	80.4	94.4	66.8	11	15	0	0		W. morn, E. night.
May, ...	29.275	29.1	83	85.	97.8	73.5	3	22	0	0		clear, squally.
Means, 1833.	29.433	29.348	76.0	79.0	87.0	69.1	132	232	?	?		
Means, 1834.	29.475	29.3	75.6	77.6	85.5	67.4	125	209	8	1		The depth of rain was not noted.
Means, 1835.	29.595	29.50	76.1	77.1	82.6	62.8	150	192	6	2		
Mean of 3 ys.	29.501	29.411	75.9	77.9	85,4	66.4						
General mean,	29.456		76.9		75.9		⅜ W. ⅝ E.					

The *Tirhút* Barometer had not been compared with my standard.

The *Cawnpore* table needs no particular remark. The daily notices of the weather are very full, but unfortunately there is no possibility of abbreviating them. I have attempted in some measure to meet this difficulty, as in the *Tirhút* tables, by numbering the days of each prevailing wind, and of rain. The predominance of easterly winds strikes me as rather anomalous during the hot season; but I have witnessed the same irregularity at *Benares.* The hot westerly wind is purely a day breeze, and very rarely extends to the night, which is generally calm, or has a light air in the opposite direction.

Abstract of a daily Register of the Weather at Cawnpore, kept by Col. G. Pollock, *C. B. during the years* 1834 *and* 1835.

Month.	10 A. M.			4 P. M.			Wind, days.				Rain days.	
	Barometer. at 32°.	Thermometer.		Barometer. at 32°.	Thermometer.							
		House.	Air.		House.	Air.	N.	E.	S.	W.		
1834.	inches											
Jan.....												
Feb. ..	29.693	—	—	—	—	—	—	6	—	8	3	only 15 days observed.
March,	29.50[illegible]	77.1	—	—	—	—	4	12	—	14	1	clear, one storm.
April, ..	29.403	80.0	—	—	—	—	5	9	—	10	3	terrific dust, storm 15th
May, ..	29.217	86.1	—	29.114	86.5	—	—	14	1	15	—	wind chgd. to W. at noon
June, ..	29.129	86.5	90.4	29.045	86.7	94.[illegible]	2	16	—	11	7	do. frequent squalls.
July, ..	29.126	84.8	85.2	29.053	85.8	87.0	1	25	—	5	5	a few light showers.
Aug. ..	29.180	84.3	84.6	29.108	86.0	87.1	4	14	1	12	13	wind variable, cloudy.
Sept....	29.279	82.5	82.1	29.189	83.3	83.9	3	20	1	6	17	much rain, cloudy.
Oct.....	29.469	77.5	77.2	29.375	80.5	80.7	10	14	—	7	4	wind strong, 1 storm.
Nov....	29.640	71.2	72.8	29.570	76.3	77.7	3	1	1	8	—	13 days obs. clear.
Dec. ..	—	64.6	64.0	—	69.3	71.0	20	5	1	5	4	clear ; rain at Xtmas.
1835.												
Jan.....	—	59.5	58.1	—	67.7	69.5	6	4	—	2	—	strong winds, cloudless.
Feb.. ..	—	64.0	64.3	—	71.0	74.7	8	6	2	12	2	light clouds, 1 squall.
March,	—	70.7	72.9	—	73.8	81.4	3	8	3	17	3	strong winds & squalls.
April, ..	—	77.8	85.0	—	78.3	92.1	6	10	6	8	9	dust storms, cloudless.
May, ..	—	82.0	93.0	—	81.8	100.0	1	18	3	9	5	unusually hot.
June, ..	29.243	82.8	87.4	29.237	83.5	93.0	2	19	2	7	13	rains begun 16th.
July, ..	29.285	81.8	86.2	29.267	83.[illegible]	88.2	1	6	7	17	11	heavy clouds. rain light.
Aug. ..	29.432	82.4	87.6	29.360	83.4	90.3	3	13	4	11	14	muck rain, cloudy.
Sept....	29.543	81.0	95.5	29.445	81.7	88.6	9	15	1	5	8	cleared on the 25th.
Oct.....	—	—	—	—	—	—	—	—	—	—	—	
Nov.	29.656			29.573								Col. Pollock's Barom.
	.922	69.7		.8[illegible]0	74.6							Dr. Dempster's do.
	.870			.751								Mr. Campbell's do.
Dec. (9 dys.)	.676			.57								Col. Pollock's do.
	.955	64.6		.70	70.0							Dr. Dempster's do.
	.898			.78[illegible]								Mr. Campbell's do.

The error of Colonel Pollock's instrument when compared with my standard in April, 1835, was only — .059. It is difficult therefore to account for its standing so much lower than Dr. Dempster's, and Mr. Campbell's, unless some accident happened to it on its return to Cawnpore.

The *Bancoora* series, being limited to two months, will not admit of an abstract; we may therefore pass to the *Nipal* tables.

Abstract of Daily Barometrical Observations, made at Katmandhu in Nèpál, by Capt. G. H. Robinson.

Months.	Mean height of Barometer reduced to 32° for the hours													Maxima.	Minima.	Daily Range.
	A.M. 7	8	10	11	12	P.M. 1	2	3	4	5	6	7	8			
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.			in.
1833.																
July, ...	..	..	..	..	..	..	..	..	..	..	..	..	..	25.126	.062	.063
Aug.......	..	..	..	..	..	..	..	..	..	..	..	..	..	.148	.083	.060
Sept.	..	..	..	..	..	..	..	..	..	..	..	..	..	.225	.153	.064
1834.																
July, ...	25.168	.176	..	.162	.144	.121	.101	..	.070	.073	.119	..	.129	..	..	.088
Aug........	.171	.185	..	.168	.159	.127	.109	..	.096	.101	.053	..	.154	..	..	074
Sept.	.257	.270	..	.259	..	.206	.168	..	.161	.174	.233	..	.189	..	..	.109
Oct........	.325	.344	..	.333	.310	.279	..	.235	.233	.240	..	.264	..	..	..	.111
Nov.	.413	.440	..	.435	.423	.328	..	.328	.354	..	..	.381	..	..	..	.086
1835.																
April,.. ..	.401	..	..	..	.395	..	.355	..	.317	..	..	.341	.	.399	.323	.074
May, ...	.305	..	..	..	.292	.	.250	..	.221	..	..	*.240	..	.301	.220	071
June,.....	.198	..	..	..	.170	..	*.125	..	*.114	..	..	*.147	..	.288	.112	.073
July, ...	*.142	..	.149	..	,125	..	*.184	..	*.073	..	..	*.102	..	.149	.072	.074
Aug.......	*.233	..	.240	..	.219	..	*.169	..	*.153	..	..	*.178	..	.287	.106	.078
Sept.	*.317	..	.320	..	.289	..	*.236	..	.218	..	..	*.238	..	.319	.217	.093
Oct.......	*.084	..	.407	..	.367	..	.313	..	.295	..	..	.305	..	.392	.291	.092
Nov.	*.513	..	.541	..	.499	..	.450	..	.425	..	..	.447	..	.539	.428	.098
Dec	*.457	..	.493	..	.449	..	.390	..	.363	..	..	.417	..	.493	.376	.113

Abstract of Thermometrical Observations, made simultaneously with the above.

Months.	Thermometer inside the house.											Thermometer outside.					Rain.
	A.M. 7	8	10	11	12	P.M. 1	2	4	5	6	8	A. 7	M. 10	12	P. 2	M. 4	
1833.																	
July, .	75.2	..	..	..	..	..	79.2	..	..	..	..	69.3	..	..	84.6	..	9,517
Aug...	73 9	..	..	..	..	..	76.7	..	..	..	.	69.6	..	..	81.8	..	13,720
Sept. .	73.4	..	..	..	..	..	77.1	..	..	..	..	67.9	..	..	78.5	..	3,822
1834.																	
July, ..	74.6	75.4	..	76.8	77.4	77.9	78.3	77.9	77.7	77.2	77.0	..	..	..	..	..	14,436
Aug...	73.7.	74.5	..	76.3	74.0	77.8	78.0	77 4	76.7	76.9	76.3	..	..	..	..	..	12,380
Sept. .	73.3	73.9	..	76.3	..	77.9	78.3	78.1	77.3	75.3	77.6	..	..	..	..	..	11,292
Oct...	66.2	66.2	..	69.2	69.8	70.2	70.7	7 .4	71.3	70.2	..	..	..	..	..	..	9,930
Nov. .	60.0	61.7	..	63.1	63.0	66.1	..	65.0	..	65,2	..	..	..	..	..	..	1,280
1835.																	
April,.	64.1	..	..	..	67.7	..	67.7	68.5	..	..	..	54.7	..	72.8	74.3	71.8	4,352
May, .	69.3	..	..	..	71.3	..	73.2	74.2	..	..	..	62.9	..	77.1	78.0	77.1	4,207
June,.	73.3	..	..	..	75.3	..	*76.2	*76.4	..	..	..	69.3	..	80.3	79.9	*76.9	7,941
July, .	*73.8	..	75.2	..	75.7	..	76.7	*76.4	..	..	..	*73.4	77.6	81-0	79.5	*74.5	14,677
Aug...	*73.0	..	74.2	..	75.2	..	*76.5	*76.0	..	..	..	*69.0	76.1	79.8	*79.6	*74.9	12,891
Sept. .	*71.4	..	72-8	..	74.1	..	75.5	75.6	..	..	..	66.6	74.0	76.1	76.1	74.0	4,416
Oct...	*64.0	..	65.8	..	67.6	..	69.7	70.8	..	..	..	*55.0	64.7	68.8	71.1	70.6	1,608
Nov. .	*55.4	..	56.5	..	58.4	..	60.3	61.5	..	..	..	*40.5	50.7	58.4	63.7	60.8	0,063
Dec...	*50.6	..	50.8	..	51.8	..	53.3	54.5	..	..	..	*34.5	41.9	49.3	54.4	54.1	1,211

The items marked with an asterisk were taken half an hour later than the hour indicated at the top of the column.

In July, August and September, 1833, the register notes only the minima and maxima temperatures, but to save room I have supposed these to accord with the hours of 7 A. M. and 2 P. M.

Of the two barometers registered at *Katmandhu*, that of the Resident has been preferred, for 1834. Capt. Robinson's tube for that year stood a quarter of an inch lower, and was hardly sensible to the diurnal oscillation. After boiling it in the month of September, however, it rose to within .02 of H.'s, and exceeded the latter in oscillation by .03. This and the circumstance of the hour of maximum 9 to 10 a. m. being unfortunately omitted among the numerous periods of the day selected for register, render not only the absolute amount of diurnal motion still uncertain for *Nipál*, but also prevent our calculating the annual average. I hope the series I am now promised by Dr. A. Campbell for 1837 will supply the want.

I reserve for a separate notice the calculated elevations connected with the *Nipál* series, as they are affected by the error alluded to in the preceding remarks, of assuming 30 inches for the barometric zero at the level of the sea.

The state of the wind in the valley has not been noted, but the fall of rain is recorded with precision, the average amount being about 50 inches.

The series for *Simla* does not comprehend an entire year, and will not therefore furnish averages. The temperature appears to be that of the interior of the house.

Abstract of Meteorological Register kept at Simla, from the 15*th May to the* 21*st November*, 1834. *By* S. M. Boulderson, *Esq.*

Month.	Barometer at 32°.				Thermometer.		
	10 A. M.	4 P. M.	10 P. M.	D	10 A. M.	4 P. M.	10 P. M
May, ...	23.816	.773	.802	033	74.0	74.5	73.9
June, ...	.784	.723	.774	.061	70.8	70.6	69.2
July, ...	.794	.729	.784	.065	67.4	67.6	66.9
August, ...	.827	.777	.803	.050	68.5	67.9	65.9
September,	.908	.832	.872	.076	67.2	66.0	65.4
October, ..	24.013	.942	978	.071	62.6	62.7	58.2
November,	.092	.041	.073	.051	57.1	57.5	54.1

The range at 7½ A. M. is also given for the month of May, the mean of the barometer being 23.798; which proves the regularity of the nocturnal tide in these elevated regions.

I must, for want of time, leave to a future opportunity the further analysis of the above tables, and the deduction of general average results from the *Calcutta* tables for the past five years. Meantime, I will conclude with the insertion of a table of the temperature at *Kandy* in *Ceylon*, obligingly contributed by Captain Ord, R. E., and a note on the temperature of the *Brahmaputra* in *Assam*, compared with that of the air at the same time by Dr. W. Griffith.

Extract from a Meteorological Journal kept at Kandy, Island of Ceylon, by Captain ORD, *R. E.*

(To complete the year 1834, broken off in the Extract published in Journal, No. 48, December 1835, page 709.)

Date.	Thermometric Range.							Rain-guage.	
1834.	Monthly Range.		Greatest Range in 24 hours.		Least Range in 24 hours.		Mean. Temp.	Rain fallen.	Fallen in 24 hours
Month.	Max. and Min.	Range.	Max. and Min.	Range.	Max. and Min.	Range.		In the month. inches.	Max. and Min.
Nov....	81½ 63½	18	81 63½	17½	67 65	2	72	30. 6	9. 0 0
Dec. ..	84 57	27	76½ 57	19½	68½ 67½	1	70½	4. 6	3. 3 0

N. B. Highest range in the shade during the year 1834, 88°, lowest 57°, mean temp. 73° 1.

Total quantity of rain fallen during the year, 96.7 inches.

Extract from the same Journal for the year 1835.

Date.	Thermometric Range.							Rain-guage.	
1835.	Monthly Range.		Greatest Range in 24 hours.		Least Range in 24 hours.		Mean Temp.	Rain fallen.	Fallen in 24 hours.
Month.	Max. and Min.	Range.	Max. and Min.	Range.	Max. and Min.	Range.		In the month inches	Max. and Min.
Jan.....	79 58½	20½	78½ 59	19½	72 67½	4½	70	8·65	0 7 0
Feb.....	85 60	25	84 62½	21½	78 70	8	72¾	0·7	0 7 0
March,	84½ 58½	26	84 62½	21½	78 70	8	73¼	5·4	2 8 0
April, ..	82 65½	16½	82 66½	15½	78 70	8	74	6·2	2 3 0
May, ..	83½ 65	18½	81 65	16	76 71	5	73¾	3	0 5 0
June, ..	80½ 66	14½	80½ 66	14½	75 70	5	72⅔	4·8	0 8 0
July, ..	83 64	19	81 64	17	75 70	5	72¾	2·7	0 7 0
Aug. ..	83½ 64	19½	80 64	16	74 70	4	72⅜	5·8	0 9 0
Sept. .	84½ 65	19½	84½ 66	18½	73½ 69½	4	72	7·15	1 8 0
Oct. ..	82 65	17	82 65	17	70 79	1	71	20·6	6 0 0
Nov. ..	85 54	31	83 54	29	76 69	7	72	6·8	1 2 0
Dec. ..	85 62	23	84 62	22	78 69	9	72½	4·4	1 5 0

N. B. Highest range in the shade during the year 1835, 85°, lowest, 58½°, mean temp.. 72·44

Mean of max. and min. for the 2 years, ... 72·125

Ditto of calculated mean temp. for ditto, ... 72·77

(Too high, in consequence of employing the hours of 8 instead of 10.)

Total quantity of rain fallen during the year, 76·2 inches.

Temperature of the Air and of the Water at Sadiyá in Assam, by Dr. W. GRIFFITH.

September, 1836.	6 A. M.						2 P. M.					6 P. M.					
	Air.			Water.			Air.			Water.		Air.			Water.		
	In House.	Over Kundeel.	Over Burrumpootur.	Of Burhumpootur.	Of Kundeel*.		In House.	Over Kundeel.	Over Burhumpootur.	Of Burhumpootur.	Of Kundeel.	In House.	Over Kundeel.	Over Burhumpootur.	Of Burhumpootur.	Of Kundeel.	
1	0	0	0	0	0		85	102	100	64	77	83	82½	82	66	79	
2	0	0	0	0	0		76¼	76	75	64	76	76¼	76¼	73	64	75¾	Light fog over B.
3	75	75	68¼	63	73½		83	85	77¾	66	75	82	81	67	66	76	
4	77	77	69¾	64	75		83½	86	78	65½	77½	83	81¾	70	66	77	
5	76	76	69	64	75	Partial fogs over Burhumpootur.	82	93	82	65½	77½	85	85	70	66¾	77	
6	0	0	0	0	0		75	76	75¾	65	76	76	76	70¼	65	76	River B. rising considerably.
7	74	74	68	63½	73¾	Slight and partial fogs over do.	84	86	77¾	65	77	82	80	69¾	65	77¼	
8	76	74	72	64	75¾	Burhumpootur risen two feet.	87	88½	8[illegible]	67	80¼	0	83¾	74	68	80	
9	74	74	74	67	76		85	87½	86	69	80	83	83	74	69	80	
10	77	76	72	67	77	Slight fogs over Burhumpootur.	86	86	84¼	68	79	0	0	0	0	0	
11	76	76	73	68	77	Partial fogs over do.	82	86½	80¼	69	79	80	81	74¼	69½	78	
12	76½	77	72½	68	76	River falling.	81	86	82	68	78	0		0	0	0	
13	77	76½	75	67	75½		85½	90	84	69	79	83	81½	76	69	78	
14	76	76½	80	66	74½	General fog over do.	86	84	86	69	80	83	83	74	70	80	
15	77	76	72	68	76		87	91½	85½	70	80	86½	82½	75½	70	80	
16	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
17	76	76	70	67	76½	Slight fog over do. *Considerable rise.*	87	92	82	69	81	0	0	0	0	0	
18	79	77½	72	67	77		88½	94	92	69	81½	87½	86	79	70	81½	
19	74	74	72	67	76¼		83	87	80	68	80	0	0	0	0	0	
20	76	75	71	66½	75½	General fog : thickest over B.	84	86½	83	69	79	0	76¼	74	68	78	
21	76¼	76	71½	67	76		78	80½	79	68	76¼	77½	76	72½	68	76¼	
22	74	75	76½	66	74	Rise in Burhumpootur of 2 feet.	84½	85	84	68	77½	0	0	0	0	0	
23	73	75	74½	66	75	Fall of Burhumpootur, slight fog over do.	85	89	86	68	80	83	82	74½	68	79½	
24	76½	75	71	67	76		86	92	84	69	80	86	82½	73½	69	80	
25	74½	74	69½	67	76		85½	91	87	69	80	86	82	73½	69	80	
26	72½	72	74	67	76		86½	91	85	69½	80	86	83½	73	68½	80	
27	0	0	0	0	0		0	0	0	0	0	86½	82½	76	69¾	80	
28	76	75	72	67	75½		0	0	0	0	0	84	82	74	6[illegible]	78	
29	0	0	0	0	0		0	0	0	0	0	82	79	77	67	77	
30	75½	75	69	65½	74½		83	84	83	67	77½	82½	80	75	67	77	

* The Kundeel is a small nullah joining the Burhumpootur at Sadiyá.

Taken with a Thermometer, graduated in scales of 2 degrees each; the instrument was nearly immersed in the water. The temperatures of both rivers are taken some distance from the banks of the Burhumpootur at about 40 yards. Scarcely any difference, however, is to be found between the temperature at some distance out and that near the banks.

XIV.—*Postscript to the Memoir on the Depression of the Wet-bulb Thermometer, published in the July number. By* Jas. Prinsep, *Sec. &c.*

I have only found leisure to repeat the experiments forming the final section of my former paper, on one more of the simple gases, namely oxygen; of which the specific heat, calculated from the data thus supplied, has not been found to differ materially from that of common atmospherical air. It follows necessarily, that azote must have the same specific heat, since the mixture of the two causes no alteration in the observed depression. The experiments were conducted in the same order as before, except that the glass exit tube was somewhat narrower, and the dry thermometer was fixed in it half an inch below the wetted bulb. Some trials, with common air, were first made to ascertain whether this arrangement produced any material difference of result.

Depressions with Oxygen gas.

		Bar.	*t*	*t'*	*d*	*h*	Max. dep. for hyg. °	Tabular max. dep.
			°	°	°			
Sept. 21	Common air,	29.65	92.0	55.0	36.8	6 ?	39.0	37.2
Oct. 2	Ditto,	29.78	83.8	51.6	32.4	0	32.4	32.7
4	Ditto,	29.75	89.5	54.3	35.2	0	35,2	35,7
11	Oxygen,	29.81	82.0	51.4	30.6	2	31.2	31.8
21	Ditto,	30.00	81.2	53.4	27.8	2 ?	28.3	31.4
Nov. 3	Ditto,	29.90	82.9	52.1	30.7	0	30.7	32.1
5	Ditto,	29.88	83.4	52.2	31.2	0	31.2	32.5

In the first experiment it is evident, that the hair hygrometer had not reached its full contraction for the actual siccity of the air enclosed in the gasometer. The trifling inferiority in the depressions for oxygen, I am inclined to attribute to the more sparing hand with which it was expended:—the difference of four per cent. is certainly larger than ought to be conceded to experimental error, but I feel sure that a more careful and longer series would have brought out a nearer approach to the depressions observed in common air.

XV.—*Proceedings of the Asiatic Society.*

Wednesday Evening, the 4th January, 1837.

The Honorable Sir Edward Ryan, President, in the chair.

Messrs. W. Dent and M. Manuk, proposed at the last meeting, were ballotted for, and duly elected Members of the Society.

Captain Edward Sanders was proposed by Major Taylor, seconded by Mr. W. H. Macnaghten.

Mr. **John Curnin** was proposed by the Secretary, seconded by Mr. **Bagshaw.**

Captain F. **Jenkins**, proposed by the Secretary, seconded by Sir E. **Ryan.**

Mr. **George Hill**, proposed by Dr. **Pearson**, seconded by the Secretary.

Mr. **Richard Walker**, proposed by Mr. **Bell**, seconded by the President.

Bábus **Ra'mna'th Tagore** and **Prasannakuma'r Tagore**, proposed by Bábu **Rusomoy Dutt**, seconded by the Secretary.

Mr. P. A. **Lair** was proposed a corresponding member by Mr. **James Prinsep**; the nomination was referred to the Committee of Papers.

The meeting then proceeded to the annual election of office-bearers, when the following gentlemen were elected.

Vice-Presidents.

Sir **John P. Grant**, Sir B. H. **Malkin**, the Rev. Dr. **Mill**, W. H. **Macnaghten**, Esq., H. T. **Prinsep**, Esq.

Committee of Papers.

J. R. **Colvin**, Esq., C. E. **Trevelyan**, Esq., Capt. **Pemberton**, Capt. **Forbes**, D. **Hare**, Esq., J. T. **Pearson**, Esq., Dr. **Wallich**, Capt. **Cunningham**, **Ramcomul Sen.**

The Secretary read minutes from the Report of the Committee of papers on the Honorable Mr. **Turnour's** proposed publication of the *Mahávansi.*

Minute by Dr. **Mill.**

In presenting to the world both the text and the translation of these extensive historical works—and in thus rescuing them from what is in many respects worse than total oblivion, the confusion and misapprehension of their real testimony which a former very erroneous publication on the subject in England was calculated to produce,—Mr. **Turnour** would have conferred a very great benefit on the historical literature of the East, had his merits even stopped at this point, and had he not further shewn by his comments, how admirably qualified he is to illustrate the work he edites, and enable every reader to profit by its contents. The literary benefit is very far from being confined to the single subject of Ceylon: it extends to the whole of India: and yields in importance to nothing that has yet been produced on that most perplexed and generally unproductive subject, the history of India prior to the thousandth year of our era.

How these documents bear on the general history of the country, will be very evident to any one who follows the able editor in his preliminary remarks, as well as in the specimen he has already given us of the first book of his series, the *Mahávansi*. It is enough to remark, that the peculiarly interesting connexion between the history of *Ceylon* before the Christian era, with that of *Magadha*, or that part of Northern India which we now call *Behar*, is attested by the very language* in which all these books are written: and that it originates with what is undoubtedly the most striking and important moral phenomena in the history of *Eastern* Asia, the rise of Buddhism from the centre of that great Gangetic kingdom. And it is observable, that the same dynasty of sovereigns of that large district, reigning at *Pataliputra,* or *Palibothra,* the present *Patna,* —from the midst of whom GAUTAMA BUDDHA arose nearly six centuries before our Lord,—presents us not two centuries afterwards, in the age of ALEXANDER and SANDRACOTTUS with the one solitary point in which the history of India coincides with that of Western Asia and Europe, from which in every other point (before the Mahometan conquest) it is so remarkably and totally separate.

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* The *Páli* in which these historical books are written, and which is the language of Buddhist literature and religion, as well in *Siam, Ava, Nipál,* and *Tibet,* as in *Ceylon,*—is in fact no other, as Mr. TURNOUR shews, and the text of his originals exhibits to every Sanscrit scholar, than the *Magadha Pracrit,*—the classical form in ancient *Behar,* of that very peculiar modification of Sanscrit speech which enters as largely into the drama of the Hindus (though in a different way) as did the Doric dialect into the Attic tragedy in ancient *Greece.* Now, all the variations of Sanscrit words that occur in these Pracrit dialects, answer closely to the forms which the same words exhibit in the vernacular Hindui of that province, and the yet more northern districts of India, as far as the Himálaya: (e. g. the omission of the *r,* the changing of *bh* to *h,* &c. &c.) and are totally unlike the forms of the same words even in the province of *Bengal,* or as infused into the languages of the Southern peninsula, and of *Ceylon* itself. And whenever corresponding words in the *Páli* and *Singhalese* occur, as they do every where, I believe it will be invariably found that the *latter,* (the vernacular words of the people of the Kandian and maritime provinces of *Ceylon,) resemble most closely* the Sanscrit original of both :—whereas the former, the sacred language, takes in all words that admit of it, the same sort of peculiar variation which belongs to the tongues of northernmost India,—shewing evidently that it was *thence,* and not from *Ceylon,* that the peculiar language as well as institutions of Buddhism came to the island,—as the *Maháransi* itself distinctly asserts. To take but one out of the many instances that might be alleged, we may give one of the most remarkable and early names of the island, viz *Tamba-pannyo,* as the Páli name is given in p. 35 of this specimen of the *Mahávansi,* viz. the "copper-palmed;" in Sanscrit *Tamra-páni.* Now this Sanscrit form, so different from the Pali, is actually the present Singhalese for the same thing, as I was assured by a competent scholar on the island: and a very convincing proof that it has ever been so, may be seen in the name by which the island was universally known to the ancients and to COSMAS Indicopleustes when he visited it, viz. *ταπροβανη.* The Greeks would be just as unlikely to introduce this *r* where it did not exist, as any other languages of India beside the northernmost ones would be to drop it where it before existed: but this is a universal character of the Pracrit and of the present Hindui, (as seen in this word, *tamba,* copper—*kám* "work" for *karm,* &c. &c. &c.)

This real origin of the celebrated name *Taprobane* (whatever may be thought of the story connected with it in the *Mahávansi,* and which may seem with greater probability to have arisen from the *tamra-varna,* or *copper colour,* of its southern cliffs near *Matura,* so well known to navigators)—is one of the points of curious and interesting information which we owe mainly to this publication of Mr. TURNOUR. Whatever had been before suggested as the probable origin of that name, so little now known except in these Buddhistic books, as one of the proper names of the great island of *Lanca* or *Singhala-dwipa,* was in the highest degree forced and improbable, (ex. gr. the Hindví *Tápú-Raban,* or the island of Rávana.)

The great value of these works, as containing correct chronological history, is well established from this unerring test by Mr. TURNOUR. And he most ably vindicates the Buddhist authors of *Ceylon* at least, from the general censure passed on them by Professor HORACE WILSON,—in reviewing the Tibet documents of M. CSOMA KÖRÖSI,—of being, if possible, more regardless of chronology than even the Bráhmans. The degree of accuracy, indeed, with which, in the midst of this long series of kings, the age of CHANDRA-GUPTA MAURYA is marked,—even admitting an error of sixty years from his proper age, as a contemporary of ALEXANDER and SELEUCUS,—is yet most wonderful, when compared with the only other chronological Indian history yet produced—the history of *Cashmír*, called the *Rája Taranginí*, (which we owe to the eminently learned orientalist just named,) whose lists would go to antedate that celebrated king by nearly twelve centuries.—On all these points, Mr. TURNOUR's observations are very valuable: and even when they may fail to produce conviction (as in some parts of the dissertation inserted in the Journal As. Soc. of September last), the learning and candour with which he prosecutes the inquiry, and the absence of all undue prepossession in favor of those authors with whom he is necessarily most conversant, ever entitle them to the utmost consideration.

It would be undervaluing these works to suppose them to be merely a dry chronological catalogue of sovereigns and dynasties: though this is frequently all that an inquirer into ancient India is able to meet with; where, between fable on the one hand, and the strong national tendency to abstract speculation on the other, the literature of the country has so little to aid a *historical* student. These works apparently contain much that may well be deemed valuable by a philosophical inquirer into history: and the details, in particular, of the contest between the antagonist principles of Bráhmanism and Buddhism, are often curiously illustrative of the genius of these two systems, which have held, and still hold, such sway over large portions of mankind.

W. H. MILL.

Minute by the Secretary.

Fully subscribing to the eulogy recorded by our Vice-President on Mr. TURNOUR's labours, which all who have read his specimen-volume and preliminary treatise will acknowledge to be most just and well deserved, I have merely to notice, that the typographical execution of his Pálí text in Roman character has been examined by a competent native scholar residing in *Calcutta*, and found to contain but a trifling list of errors, and those chiefly of the accented letters. There are blanks in the manuscript which it might be possible to restore by collation with the copies of the *Mahávansí* in the Burmese character, easily procurable at *Ava*. I have sent the specimen to Colonel H. BURNEY, who will, doubtless, be happy to contribute his collateral aid to this meritorious undertaking.

An opportunity has lately fallen in my way of verifying a portion not of the great Pálí History, but of its Singhalese continuation translated in Mr. TURNOUR's Tabular Epitome of Ceylon Dynasties. Captain ORD having lately called my attention to the form of a letter* on one of the ancient coins of Dambadinna hitherto but imperfectly decyphered, at the moment when I was transcribing a *Delhi* inscription of the eleventh century ; the form of other letters struck me as very similar to that type, and hence, on re-examining all the coins I possessed, and the drawings of others sent me by Captain **Ord**, I was forthwith enabled to recognise the names of no less than six kings, all occurring in Mr. **Turnour**'s list within the two centuries immediately subsequent to the *Sholian* conquest†, and thus forming a chronological link with one of the dynasties of Southern India, which has been but very imperfectly lifted from obscurity by the researches of Colonel **Mackenzie** and others in India proper.

J. **Prinsep.**

The Society concurring entirely in the Committee's view of the value of Mr. **Turnour**'s intended publication, particularly in regard to the light it throws on the early history of India, it was resolved to advocate its patronage by the Government of India, to the fullest extent that it may have been usual for Government to subscribe to private enterprizes of similar importance in India itself.

Library.

The following books were presented.

Catalogue of 7385 Stars, chiefly in the southern hemisphere, by Mr. W. **Richardson**—*presented by the Lords of the Admiralty.*

Memoires de l'Academie Royale de Caen, 1825—1829.

Annuaire du Calvados for 1833-34-35, 3 vols.

Essai sur les Combustions Humaines, par Pierre-Aimé Lair, 1 vol. (3 copies) and various tracts, essays, notices, by Mr. **Lair** and other Members—*presented by the Royal Society of Caen.*

Memoires sur La Conformité Organique dans L'Echelle Animale par Ant. Duges—*presented by Mons. J. C. Villaire, Surgeon of the French Corvette Aube.*

Ward on the Hindus, 2 vols. (purchased.)

Extract of a letter from Dr. **Walne** to Captain **Crawfurd** (recently arrived from *Egypt*) was read, expressing a desire to place the Literary and Antiquarian Society at *Caïro*, instituted by himself, in correspondence with the Asiatic Society of Bengal.

The Secretary stated that he had opened the desired intercourse by addressing to Dr. **Walne** copies of the Arabic works printed by the Society, and of the Ethiopian inscriptions printed in the Journal, in hopes of their being decyphered.

Museum.

A variety of specimens of Native ornaments were presented by Bábu **Herambana'th Tha'kur.**

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* The first letter of the 3rd line in the coin fig. 22 of Pl. L., in vol. iv. which was read *tr*, but ought to be *h*, being joined on the left and open on the right.

† Srí Vijaya Vahu 1071, Srí Parákrama Vahu 1153, Srí rája Lilavatí 1197, Srí Kríthi Nikanga 1187, Srí mat Sahása Malla 1200, and Srí Lokèswara 1210.

Physical.

Extracts of letters from Lieutenant G. **Fulljames** and Captain A. **Burnes** were read, announcing the dispatch of further fossils from *Perim*, in the gulph of *Cambay*.

Mr. H. **Walters** presented a very large fragment of a fossil tree from *Bírbhúm*, upon which there appeared a cut as of a hatchet, made before the wood was petrified. (?)

A letter was read from M. **Jules Desjardins**, dated Maurice 29th September, 1836, forwarding meteorological observations made from April to August inclusive, and promising to continue the series if acceptable.

A note from Dr. **Spilsbury** explained that the large fossil acetabulum of the elephant, presented at a former meeting, was not found at *Segouní*, (whence the femur of 1834 was extracted,) but from the hill close to *Jub lpur*, which Captain **Sleeman** first brought to notice. The positions, therefore, of these large fragments were 60 miles asunder.

Another fragment on a still more gigantic scale, the lower end of the humerus, was now presented: and Dr. S. announces three more large fossils on their way to *Calcutta*, from two spots visited by Major **Ouseley**.

The skeleton of the *Sumatran* Orang-otang which lately died in Calcutta (wanting the hands and feet) was presented by Mr. R. W. **Frith**.

A large ostraceous shell was presented by the Rev. M. **Hill**.

The Secretary read his Report on the past year's proceedings, of which the following is the substance.

The number of new Members added to the list in 1836 had been

Ordinary Members,	24
Associate Members,	2
Honorary Member,	1
The loss by death, 2; by departure to Europe, 1; and withdrawal, 3; in all	6

The financial operations of the year were as follows:

Payments.

To house establishment and contingencies, from December, 1835, to October, 1836,	2969	11	5
To salary of the Curator, and museum contingent, from December, 1835, to 30th November, 1836,	2591	14	0
To copies of the Journal supplied to the Members to 31st December,	1088	0	0
To Sheriff and Co.'s bill for repairs,	311	11	8
To matting the hall and part of the museum with ratan,	155	3	6
To new almirahs, shelves, tables, &c.	533 187	11 9	4 6
To Orphan Press bill for printing 1st part, 20th vol., including authors' copies, &c.	1871	13	4
To lithography and printing plates of Physical volume xix.	524	12	9
To freight to Madras, &c.	17	1	0
Total,	10,251	8	6

Receipts.

By balance of past year's account, Sa. Rs. 380 15 2, or	406	5	6
By quarterly collections and admission fees realised,	6551	9	9
By 3rd Dividend on the Estate of Mackintosh and Co.,	382	13	7
By Government for establishment retained by the Society for keeping in custody the Oriental books transferred from the College of Fort William, from April to November, 1836, at 78 per month,	624	0	0
By Interest on Government Securities deposited with the Government Agent,	2093	0	4
By balance in deficit,	193	11	4
Total,	10,251	8	6

Outstanding Bills due.

For the XIXth vol. 1st part, with authors' extra copies,	1646	8	8
For Journal sup[illegible] Members,	1284	0	0
Establishment, Curator, &c. 2 months,	1150	0	0

Contributions due.

3rd Quarterly Subs. to Sept.	1705	1	5
4th Ditto - - to Dec.	1280	0	0

Oriental Publications.

Payments.			
To paid several bills for printing Sanscrit and Arabic, ...	6900	8	6
To Pandits and Maulavis for correcting press, ...	160	0	0
To writer and cashier, ...	150	0	0
To expense of removing College Library, and sundries, ..	18	10	6
To purchase of four book cases from the Education Committee, .	59	11	8
To cash realised by sale of Inaya, transferred to Ramdhan Sen, on his engaging to complete the work,	300	0	0
To freight to Europe, packing, &c.,	192	15	7
To postage, cooly hire, &c. ..	55	9	3
To balance in hand, ...	2174	8	7
Co.'s Rs.	10,012	0	1
Outstanding Bills due to the end of 1836, ...	2204	9	11

Receipts.			
By cash balance of last year, ..	118	10	2
By amount realised from public subscriptions to the Alamgiri, ..	5786	10	8
By private subscriptions for that and other works realised, ..	2909	2	8
By sale of books, ...	615	8	7
By ditto to Education Committee, ..	504	0	0
By establishment for care of books allowed by Government for March (afterwards entered in general account,)	78	0	0
Co.'s Rs.	10,012	0	1
Subscriptions to be realised for works delivered, say, ...	1000	0	0

"The publications by the Society and under its auspices have been this year unprecedentedly numerous. Of the Researches, two half volumes have been completed, one literary and one physical: the latter containing no less than 21 plates. Thirty, indeed, have been engraved, but nine are necessarily kept back, from the text being yet unfinished. It is my duty to bring to the notice of Members in what manner I have been enabled to publish so many finished plates, engraved in a style much superior to those of former volumes, without entailing an expense much beyond that of the paper on which they are printed.

"The lithographs of the snakes and some of the botanical plates were kindly drawn by Dr. Cantor; the remainder of the latter by the artists of Dr. Wallich's establishment: one or two have also been executed by myself: but by far the greater portion, including nine mezzotinto and six line engravings, have been executed on holidays and at early leisure hours, by Ka'sina'th, the chief die engraver of the Mint, who most liberally refuses to accept any remuneration for them, considering himself under some little obligation to the Society and to myself for having brought his talents to notice. I trust the Society will testify in an appropriate manner their acknowledgment of such a disinterested and noble act.

"Besides these works, the Society has witnessed in the course of the past year, the completion of the Fatawa Alamgírí, the second volume of the Mahábhárata, (of which the third volume is also far advanced,) the Rája Taranginí, the Susrúta, the Naishadha, and the Anis ul Musharrahín, leaving only the remainder of the Mahábhárata and a few pages of the Khazanat ul Ilm, to be accomplished, of all the works transferred from the Committee of Public Instruction*.

"Collaterally the Society has taken under its auspices the publication of the Cochin-Chinese Dictionary, of the Alif Leila, and of an Anglo-Burmese Dictionary of which the manuscript ordered to be printed under the patronage of Government, has been placed in my hands by Mr. Lane its compiler, on his departure for England; meantime our representative in England, Professor Wilson, is engaged in passing the Moorcroft journals through the press at the risk and credit of the Society.

"In this sketch I do not allude to the journal and the appendices published therewith, although it must be well known to all that this work owes its principal and most valuable contributions to its acknowledged connection with the Society.

"In reference to the expectation held out in last year's report, the Government has, in the course of the present year, transferred to the Society the two branches of the Oriental Library of Fort William, manuscripts and printed works, and has liberally granted a monthly allowance for their preservation. Further donations of a valuable nature have been made by the French Government; the Lords of the Admiralty, the Commissioners of Parliamentary Records, (through the Government,) and by Dr. **Lumqua** and other private individuals, in addition to the customary tribute from the learned Societies of Europe and America.

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* The Inaya has been transferred to the Editor, Bábu Ra'mdhan Sen, under agreement that he should complete it.

"The Museum has continued to increase rapidly; but its means of doing justice to objects presented has been limited for want of funds. The fossils particularly require more cabinets and more space. Captain **Cunningham's** present of Sárnáth sculptures forms the chief object of notice in the antiquarian museum. Depredations to an unfortunate extent have been lately made by some of the servants of the house, in articles ornamented in silver and gold; which the Librarian partly attributes to the opening of the rooms at so early an hour. Inquiry is now pending at the police, and measures must be devised for better securing our increasing property.

"Some propositions have to be submitted for the publication of further oriental works—but the first to which I would beg the Society's attention are the catalogues of the College manuscripts which have been prepared for the purpose by the Pandit and Maulaví in their respective languages. To the former of these I would recommend that Mr. **Hodgson's** revised catalogue of Buddhist works extant in *Nipál* should be added.

"There are in the Society's portfolios a considerable number of original drawings and inscriptions, (besides several bound MS. volumes of the **Mackenzie** drawings) which it would be extremely desirable to publish at the present time, when an effort seems to be simultaneously making in India and in Europe to read the history of ancient India through the medium of her monumental records. The Ceylon portion would serve to illustrate the great work upon which Mr. **Turnour** is engaged; while those of the peninsula would form an appropriate appendix to the review of the **Mackenzie** MSS. at Madras, which the Society has recommended to be undertaken by Mr. **Taylor**. Were a single competent native draughtsman added to the Government Lithographic Establishment, this object might be attained at a comparatively trifling cost: and I think it would be worthy the Committee of Papers to suggest some measure of the sort to the present Ruler of India, who has accepted, not as an idle honor, the high post of Patron to our Society.

"The last act of the past year has been the establishment of a Committee for statistical inquiries, of the success of which it is yet too early to speak, but not too early to augur well from the known zeal of those who have undertaken the Herculean task."

An application signed by all the students of the Sanscrit College, for the Society to print the *Magh kávya* (of which the edition published by Mr. **Colebrooke** some years ago is now extinct) was referred to the Committee of Papers.

The same measure was taken regarding an application from **Madhusu'dana Gupta** pandit, in favor of printing the Sanscrit translation of **Hooper's** Vade Mecum, suspended by the Education Committee.

Fifty copies of the Susrúta (2 vols.) were voted to **Madhusu'dana** for his trouble in correcting the proofs of that work.

Meteorological Register, kept at the Assay Office, Calcutta, for the Month of December, 1836.

Day of the Month.	Observations at 10 A. M.							Calculated Humidity.			Observations at 4 P. M.							Calculated Humidity.			Register Thermometer Extremes.		Rain.	Wind.		Weather.	
	New Stand. Barometer red. to 32°.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew point.	Hair Hygrometer.	Centesimal tens. of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.	New Standard Barometer.	Old Stand. Barometer at 32°.	Thermometer in air.	Depression of wet-bulb.	Do. by Leslie's Hygro.	Dew-point.	Hair Hygrometer.	Centesimal tension of vapour by wet-bulb.	Ditto by dew-point.	Do. by hair Hygrom.	Cold on roof.	Heat in sun.		10 A. M.	4 P. M.	Morning.	Evening.
1	30,032	30,082	72,1	8,3	8,3	48,5	86,0	57	46		29,823	29,994	77,1	12,5	11,8	48.3	82,0	44	38		55,2	89,0		N.W.	N.	clear.	fine.
2	,042	,094	72,0	9,8	9,6	47,8	84,0	50	44		,927	,998	76,3	13.0	11,7	48 4	81,0	40	40		54,5	94,0		N.	N.	do	clear.
3	,052	,098	71,3	7,9	8,2	47,3	85,0	60	45		,906	,974	75,9	11,5	10,3	46 8	83,	47	38			106,0		N.	N. E.	do	cumuli.
4	,045	,090	71,3	7,9	7,5	55,0	82,0	60	53		,943	30,000	76,1	11,9	10,7	53 0	73,	45	47		53,8	93,0		N.	n.	do	clear.
5	,095	,127	69,9	5,8	6,4		88,0	69			,991	,042	75,7	12,6	11.7	54 3	81,	42	50		52,0			N.	N.	do	do
6	,125	,164	70,7	6,1	6,2	54,3	87,0	67	58		30,006	,064	75.5	14,0	14,7		80,	35				99,0		n.	N.	do	do
7	,144	,180	70,2	5,9	5,8	54,2	88,0	67	58		,022	,076	75,7	13,0	12,0	47,0	82,	40	38		53,5	90,0		w.	n.	do	do
8	,120	,160	70,0	5,8	6,0	54,2	86,0	60	59	70	,901	,937	74,6	11,3	10,3	50.3	76,	45	44	52	54,0	101,0		n.	n.	do	fine.
9	,108	,146	70,5	6,5	6,6	50,0	85,0	65	45	68	29,981	,040	76.0	11,8	10,7	49,7	74,	45	42	49	54,2	95,5		n.	ne.	do	clear.
10	,091	,134	79,5	6,7	6,4	50.5	85,0	65	53	68	,976	,032	75,1	12,6	11,1	51,0	73,	39	45	48	56·2	97,2		n.	n.	do	do
11	,083	,10[illegible]	69,1	8,9	8,3	53,0	79,0	52	58	57	,945	,000	74,2	13,0	11,1	49,0	73,	39	43	48	54.2	88,0		n.	n.	do	do
12	,053	,096	68,9	9,7	9,3	49,2	78,	50	52	55	,932	29,987	74,0	12,7	11,3	49.1	72,	40	44	46	51,0	90,0		ne.	ne.	cirri.	do
13	,043	,083	68,3	8,7	8,7	50,0	79,	52	54	57	,956	,963	74,3	12,7	11,3	49,0	72,	40	43	46	51,2	80,2		N.	nw.	clear.	do
14	,036	,076	68,5	8,1	7,7	53,5	81,	55	61	61	,915	,792	74,3	12,0	10,7	50,5	76,	42	45	52	52,0	95,0		nw.	N.	do	do
15	,038	,078	69,0	7,6	7,1	52,5	82,	60	58	63	,914	,973	73,8	11,0	10,0		76,	45		52	54,0	90,0		n.	n.	do	cumuli.
16	,027	,064	68,9	6,3	6,1	53,5	86,	65	60	70	,906	,964	73,9	10,6	9,8	48,0	77,	50	41	54	53,0	95,4		nw.	nw.	do	clear.
17	,049	,087	67.5	6,3	6,3	53,0	84,	65	61	66	,887	,946	74,2	13,9	12,9	47,8	71,	35	42	45	50,0	87,0		N.	nw.	do	do
18	,022	,062	67,6	9,4	8,9	48,2	77,	50	52	54	,867	,946	73,8	12,0		52.0	73,	42	49	48	47,5	96,[illegible]		N.	nw.	do	do
19	,066	,098	67,9	6,3	5,7	54,3	84,	65	63	66	,908	,959	74,9	10,3	8,3	52,2	78,	50	47	56	52,0	102,8		N.W.	n.	do	cumuli.
20	,011	,048	69,5	5,1	5,6	52,0	84,	70	56	66	,869	,926	76,3	11,6	11,0	4[illegible],3	76,	45	41	52	53,0	96,5		N.W.	ne.	do	clear.
21	,017	,061	71,4	7,7	7,4	52,2	81,	60	53	61	,883	,941	75,7	10.6	9,6	53,2	77,	50	47	54	53,0	106,0		N. E.	N.	do	do
22	,005	,045	70,7	6,8	6,8	51,9	84,	65	53	66	,903	,960	75,8	11,4	10,4	51,0	76,	47	44	52	53,5	98,0		N.	ne.	do	do
23	,007	,046	70,7	6,6	6,3	51,0	84,	65	52	66	,876	,936	75,8	11,3	10,2	52,6	74,	47	46	49	52,5	110,0		nw.	n.	do	do
24	,008	,046	71,9	8,1	8,1	51,6	82,	60	52	62	,882	,949	77,9	12,9	5,2	54,0	72,	42	46	46	51,2			se.	ne.	do	do
25	,013	,046	69,1	6,9	7,0	56,5	81,	62	66	61	,890	,948	75,2	12,4	10,7	53,3	73,	42	49	48	50,0	91,1		n.	N. E.	do	do
26	,090	,046	69,9	7,9	7,3	52,3	82,	60	56	63	,898	,946	74,8	11,0	10 0	52,5	74,	42	48	49	52,0	98,0		nw.	n.	do	do
27	,130	,106	69,3	9,5	8,9	48,0	77,	50	49	54	,951	30,002	76,1	12,9	10,9	50,6	71,	40	42	45	51,4	92,7		N.	n.	do	do
28	,194	,162	69,9	7,5	7,1	54,8	81,	60	67	61	30,015	,060	75,6	11,9	10,0		73,	45		48	52,2			N.	N.	do	do
29	,124	,213	67,8	9,7	8,7		78,	50		56	,033	,075	73,9	13,4	11,5		70,	37		44	51,5	92,		N.	nw.	do	do
30	,024	,144	65,6	8,9	6,3	52.8	78,	50	64	56	29,954	29,999	73,3	13,9			69,	35		42	43,0	80,		nw.	nw.	do	cirri.
31	,029	,048	65,3	9,6	9,0		78,	45		56	,889	,934	73.2	14,7	15,0		68,	30		41				N.	nw.	cirrocumulus	hazy.
Mean,	30,060	,098	69,5	7,6	7,3	50,0		59			29,931	29,989	75,1	12,2	10,7	50,5		42						gentle	N.	clear but not cold.	

The difference of the old and new Barometers this month, has been 038 and 058 at 10 and 4 o'clock respectively. The failure of the American ice towards the close of the month suspended the observation of the dew point. A fresh supply has since arrived. The hair hygrometer is a new instrument not yet very correctly graduated.

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